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ABSTRACT

This publication presents excerpts from a literature review on the process of budgeting and assessing financial need requirements for public colleges and universities. Excerpts highlight funding formula approaches used by some states and higher education institutions, linking funding with educational quality, funding formula development and components, formula usage, and comparative analysis of the existing budget formulas used for justifying budget requests and fund allocation for the operating expenses of state-supported colleges and universities. In addition, excerpted materials examine marginal costs and formula-based funding, a special funding formula for state-supported upper-level institutions, differential funding for statewide systems of postsecondary education institutions, the state university funding process, and state funding formulas for higher education in the Southern Regional Education Board states. Contains 61 references. (GLR)

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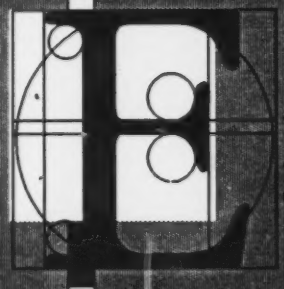
FORMULAS FOR FUNDING PUBLIC HIGHER EDUCATION



EXCERPTS FROM THE LITERATURE

HE 026278

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Educational Research Quarterly

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FORMULAS FOR FUNDING PUBLIC HIGHER EDUCATION

Anthological Excerpts From The Literature

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December 26, 1992

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Agor, W. H. (1975). *Financing the Next Decade of Higher Education in Michigan: a Staff Report Projecting State Enrollment, Cost, and Revenue Trends to 1980 and 1985.* Lansing, Michigan: Higher Education Management Services, Michigan State Department of Education.

Conclusions:

In the near term, the present funding policies should be modified to include support for a funding formula by level of instruction and by program as cost data permits. In the long-term, the enrollment related funding formula should probably be modified, and consideration given primarily to funding particular programs and services offered by colleges and universities apart from total enrollments.

Alabama Commission on Higher Education (1991). *Unified Budget Recommendations.* Montgomery, Alabama: Author.

Henry J. Hector, Executive Director in the letter of transmittal:

"Since the very nature of funding public activities creates constant change, no study of such funding can ever remain completed. We are committed to continuing this work to ensure that Alabama's citizens receive a proper return for their investment in public education....We ask for your continued support of our efforts to bring an increased level of realism and accountability to public higher education finance. Only through concerted efforts will we successfully address the challenges that face us." (NOTE: The spelling of 'successfully' is Hector's.

p.C-1: ACH's recommendations for the funding of postsecondary education are based on several types of assessment:

A set of formulas which relate funding needs for the regular academic programs of the senior and junior institutions to student credit hours, faculty productivity, and faculty

salaries.

Constructed formulas for the schools of medicine which relate funding needs to current uniform teaching procedures.

Facilities Renewal Allowance is an estimation of the amount of money needed to provide for the aging of all building elements in a given year.

Updated values for ongoing research and service activities and for other instructional activities which are not susceptible to "formula" determination, derived from earlier funding levels.

Analysis of funding needs for new programs and major changes in existing programs based on estimated expenditures and revenues.

Regular Academic Program Formula:

Class size of 1:26 for doctoral institutions and 1:24 for regional institutions. Lower Division Credit Hours were calculated at 95% of existing undergraduate weights and Upper Division Credit Hours were calculated at 105% of current undergraduate weights. Remedial credit hours receive an additional 21% increment.

Academic Support: 5% of the amount generated for instruction.

Research: 2% of combined amounts for instruction and academic support plus 5% of 1988-89 sponsored research.

Public Service: 2% of combined amounts for instruction and academic support.

Library Support: Undergraduate $7.03/SCH; Graduate I (Masters) $14.12/SCH; Graduate II (Doctoral) 60.46/SCH; Law $37.30/SCH.

General Administration and Student Services: 1,000 or fewer $626.57/headcount; 1,001 to 2,500 $316.47/headcount; 2,501 to 3,999 $215.39/headcount, for enrollments greater than 4,000 $356.22 for

first 4,000; 4,001 to 8,000 $266.78; over 8,000 $239.95.

Physical Plant

and Custodial Services: Gross square feet times $3.60.

General Institutional

Support: 14% of total of all items excluding utilities.Alabama Commission on Higher Education (1988). Unified Budget Recommendations for Fiscal Year 1989-90. Montgomery, Alabama: Author ED 329 142.

Regular Academic Program Formula:

The average funding rate per full time equivalent student for regular academic programs of the senior institutions of the other southern states, for the last fiscal year, is calculated, using data furnished through the Southern Regional Education Board. This rate is multiplied by the total FTE enrollment for the preceding year of the Alabama universities, to produce an equivalent total funding amount for the Alabama institutions. These amounts are modified to reflect:

a. Extraordinary items resulting from traditional legislative over-rides,

b. Alabama's system of funding for Teacher's Retirement and Social Security, and

c. inflation anticipated from the last year to the budget year. p. C-1

Instruction: The three year average of actual on-campus weighted semester credit hours is applied to the instructional multiplier (54.534832).

Academic Support: 5 % of instruction.

Research: 2% of instruction and academic support plus 5% of sponsored research in the previous year.

Public Service: 2% of combined amounts for instruction and academic support.

Library support: By SCH times a weighting factor per SCH: Undergraduate $6.39/SCH, Graduate I (Masters) $12.83 per sch; Graduate II (Doctoral) $54.95 per SCH; Law $33.90 per SCH.

General Administration and Student Services: by Headcount:

1,000 or fewer	$569.40
1,001 to 2,500	$287.59
2,501 to 3,999	$195.73

For institutions with approved headcount above 4,000:

First 4,000	$323.72
4,001 to 8,000	$242.44
Over 8,000	$218.06

Fiscal Plant Maintenance and Custodial Services: Projected gross square feet time $3.27.

General Institutional Support: 14% of amount calculated up to this point.

Utilities: Previous rates (adjusted for gross square feet changes) plus 5%.

Remedial Courses are Funded With an Increment of about 25% more SCHs than actual.

Alfred P. Sloan Foundation (1980). *A Program For Renewed Partnership, the Report of the Sloan commission on Government and Higher Education.* Cambridge, MA: Ballinger Publishing company.

...combine a flat basic grant that covers a substantial part of each institution's overall budget with a per student allowance that provides the remainder. p. 17

Brinkman, P. (1983). Trends in Higher Education Financing. In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission, and Financing Options.* Tucson, Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, p. 229-242.

p. 238: The total net costs to students and their families constituted one-third of total higher education costs.

p. 238-239 Average total net costs for full time undergraduate students increased 68 percent in current dollars from $2600 to $4380 per year...Average total net costs for full time graduate students increased 83 percent in current dollars, from $3890 to $7120 per year, an increase of just 1 percent in constant dollars (CPI).

Caruthers, J., K. and Marks, J. L. (1988). *State Funding Formulas For Higher Education In The SREB States.* Atlanta, Georgia: Southern Regional Education Board.

ARKANSAS FORMULA: Research a percent of teaching salaries. Public service as a percent of teaching salaries. Libraries: base funding plus a percentage of FTE students not including museums and galleries. Scholarships and Fellowships: 7 percent of tuition and fee income. Equipment replacement: en percent of equipment inventory. Process of estimating self-generated revenue: 3-year enrollment rolling average times policy tuition rates.

FLORIDA: Separately budgeted research centers. Public service is included with instruction.

GEORGIA: Academic Support: 17.7 percent of instruction, research and public service.Institutional Support: 23.1 percent of instruction, research and public service. Major repairs/rehabilitation at 0.75 percent of

current replacement value. Quality Improvement Program: 1 percent of formula request. Academic Support: Base level plus rate per student credit hour. Student Services: Base support level plus rate per headcount students.

MARYLAND: Research: 40 percent of sponsored research.

SOUTH CAROLINA: Research: 25 percent of prior year's sponsored research expenditures. Public Service: 25 percent of prior year's sponsored public service expenditures. Libraries: 10 percent of formula amount for instruction. Other Academic Support: 12 percent of formula amounts for instruction, research and public service. Institutional support: the larger of $50,000 or 15 percent of all other functions.

TEXAS: Research: number of full time equivalent faculty times $1,200. Faculty development: 1.25 percent of faculty salaries, minimum of $20,000. Educational Opportunity Service: $35,000 plus $50 per headcount minority student.

Clausen, S. (1988). *HIGHER EDUCATION FUNDING FORMULA TASK FORCE.* Memorandum to Campus Heads, Baton Rouge: Board of Regents.

There are many concerns and issues which have been raised through the course of discussions by our group;

1. How can equity be assured by the formula?
2. How can quality be enhanced?
3. How can the formula reflect the unique role, scope and mission of individual institutions?

Such overall questions and issues are often difficulty to address and incorporate into the somewhat technical "nuts and bolts" analysis which the formula review entails, but we must not lose sight of what our funding formula must ultimately accomplish. that is, it must allocate state funds to each institution on a basic which will allow each school to fulfill its designated mission within the state system of higher education in a manner that ensures quality educational services to the students and citizens of the state.

Cooper, J. M. (1986). Financing Academic Libraries: Making the Transition from Enrollment Growth to Quality Enhancement, *College & Research Libraries, 47, 4,* 354-359.

Studies of the major influences on library costs have found a substantial portion of library costs to be fixed or influenced by factors other than enrollment. Any producer of goods and service, whether public or private, incurs certain fixed costs regardless of size. Enrollment is just one of several variables reflected in standards developed by the Association of College and Research Libraries (ACRL). The formula for calculating the number of volumes is influenced much more by the number and type of academic offerings than by enrollment. It takes a change of four hundred full time students to have the same impact as adding a single master's field (when no higher degree is offered). Consequently, funding formulas utilizing ACRL standards as a basis for calculating cost would be less sensitive to enrollment declines.

Fixed costs associated with many academic functions are extremely hard to quantify, but ACRL standards can provide a basis for redesigning funding for formulas to reflect fixed costs. In 1979 the University of Wisconsin System initiated a study of fixed and variable costs because of a concern that the state funding formula did not adequately reflect actual cost behavior.[7] One purpose was to better understand the resources required for academic libraries if they were to continue providing adequate support during a period of declining enrollment. The Wisconsin

study found that fixed costs represented 67.1 percent of total library costs for four nondoctoral institutions.

ACRL standards provide the basis of a "core funding" formula developed in 1982 by the Arkansas Department of Higher Education. A fixed amount of funding is recommended for a core library program supporting existing academic programs and a base enrollment level. Fixed core amounts vary for four types of institutions and base enrollment levels as shown in table 3. The average funds per student in the core program ranges from a high of $264 for doctoral to a low of $211 for two-year, considerably higher than the marginal rate of $138. The lower marginal rate is derived from ACRL standards allowing fifteen volumes per FTE student.

Other states have also successfully incorporated the use of ACRL or other appropriate standard into library formulas. A special task force revised the library formula used by the Maryland State Board for Higher Education. Changes came in response to concerns of university librarians that funding guidelines based solely on enrollment were too simplistic and unrepresentative of the scope and nature of library services. The revised library guideline consists of five parts: a fixed cost component, a component for normal book purchases based on 5 percent of the American Library Association standards for each library, a component to reflect faculty needs, a component for research needs and a component for enrollment. The Virginia Council of Higher Education has added a basic staffing requirement regardless of Research Libraries or other appropriate standard in calculating expenditure requirements for maintenance of current collections. The revisions made by these states rest on the assumption that a library must support a relatively fixed array of academic courses, mix of faculty, and research programs.

Redesigning funding methods to recognize fixed costs changes the underlying premise from one that funding should flow from enrollment growth to one linking funding with programmatic decisions. If significant enrollment decline is forecast or is occurring, decisions to

cut back library funding should result from a review of the scope of academic programs and desired library services. For example, cancellation of health care periodical subscriptions should come from a decision to phase out a graduate program in public health rather than from a forced reduction caused by enrollment-driven formula.

Incorporating into funding formulas an analysis of library volumes required by ACRL or other appropriate standard draws attention to the gap between existing and required volumes. Several states have recommended funding, in addition to formula amounts, to allow institutions to progress toward meeting library standards. During the last three biennia $6.4 million has been appropriated from capital improvement funds to Arkansas colleges and universities to address arrearage in library collections. Capital funding has been in addition to regular state operating funds. Funding for each institution was recommended to either close the gap between existing volumes and ACRL standards by 10 percent or add 2 percent to total volumes required by ACRL standards, whichever was greater. The North Dakota State Board of Higher Education approved a task force plan to attain, over the next three biennia, library collections and services comparable with other academic libraries in the region. a total of $317,155 was recommended for the 1985-87 biennium. A final example of over-formula funding is contained in the Virginia formula described earlier. Institutions showing a major deficiency in library holdings may request additional funds for reducing the deficiency.

State action to address library deficiencies is certainly laudable, but is it sufficient? What if institutions choose not to spend additional funds for library volumes? Extra funds to reduce deficiencies could supplant funds normally budgeted for collection replacement without increasing the total library budget. If additional funds are provided in proportion to the deficiency, what incentive or reward is provided for institutions which have struggled to improve library collections? Why should institutions that starve library budgets be rewarded with larger funding

recommendations? An important task in redesigning formulas is to encourage effective library management and planning by rewarding performance. However, efforts to redesign library formulas have not responded to the challenge of creating formulas which reward successful results.

THE NEXT CHALLENGE-ENHANCING QUALITY

Many of those responsible for making state funding decisions are seeking ways to link quality with funding. Funding formulas that strive to treat similar institutions alike can have a "leveling" effect on institutional quality. For example, using a statewide average cost rate for a group of similar libraries benefits the ones below average and inadequately supports more diverse or specialized libraries. None of the library formulas reviewed for this paper attempt to hinge a portion of funding to excellence in the delivery of library services. Some formulas may even retard improvements by yielding larger funding recommendations for those libraries with the weakest collections compared with ACRL standards. If an institution embarks on a program to improve its library collection and services by raising private funds, by budget reallocations, or other strategy, the institution assumes all the risk and anxieties. The addition of selective funding incentives could encourage institutions to take risks that could enhance quality.

Every formula has a reward or incentive system, and since 1979, Tennessee has been experimenting with performance-related funding. The Tennessee policy allows an institution to earn an additional amount, up to 2 percent of its budget, determined by performance on five variables. The variables assess overall performance such as the number of programs accredited or the performance of graduates on tests in their major fields. A recent study by the Education Commission of the States found that innovations various states have undertaken in the last several years encourage quality improvement. The most common approaches provide special funds for quality improvement for specific programs or general areas, deemphasize enrollment as a basis

for appropriations, and provide special endowments or matching grants to attract top faculty.

Much of this paper discusses redesigning formulas to deemphasize enrollment as the driving force for funding. Going beyond that step to innovations which enhance quality is desirable, but not without problems. Where quality determines a portion of founding, there will be winners and losers. Where a portion of funding linked to attainment of ACRL standards, tremendous pressure probably would mount to dilute the standards so more institutions would qualify. Developing new measures of performance could be costly and might result in giving attention to the most easily measured efforts rather than the most important aspects of library services. It might be that after a few years of trying, states will abandon efforts to design funding strategies which enhance quality. However, if states persist in their efforts, those library administrators willing to contribute to the process may be among the winners. Given the contributions that technological advances can make toward improved library services and the critical importance of libraries to an institution's instructional programs, funding innovations which address quality could very likely result in improved funding for library services.

Coordinating Board, Texas College and University System (1981). *Informing the Future: A Plan for Higher Education for the Eighties.* Austin, Texas: Author.

The three functions often ascribed to higher education-teaching, research and public service-are not separate but interdependent and complementary. Research is a basic component of good teaching, the source of new knowledge and the means of producing scholars to carry on the work of expanding knowledge. The habits of mind necessary to function well as an educated person are also those fundamental to research: curiosity, the ability to ask relevant questions and the competence to find ways to progress toward answers. A good teacher develops these traits in students and exemplifies them in the approach to the field of study. Thus students and teachers

are mutually involved in knowledge development. this process and interrelationship is especially characteristic of and fundamental to graduate education but can and should occur at all levels.

Cross, K. P., J. Valley and Associates (1974). *Planning Non-Traditional Programs: An Analysis of the Issues for Post-Secondary Education.* San Francisco: Jossey-Bass.

Those who support budget formulas believe that: 1) such formulas provide an objective measure of the funding requirements of college and university programs since they do not rely on the judgments of program officers and administrators; 2) budget formulas can reduce open competition among institutions for state funds and can assure each institutions of an annual operation appropriation; 3) budget formulas provide state officials with a reasonably understandable basis for determining the financial needs of higher education; and 4) budget formulas provide a balance between state control over each item in a budget and total institutional autonomy in fiscal matters. p. 11

...include a percentage for program development as a new category of funding formulas. p. 12

Florida State Postsecondary Education Planning Commission (1992). *State University System Funding Process.* Tallahassee, Florida: Author.

Call for a special funding formula for "high risk" or "at-risk" students. An additional 10% to FAMU for student services.

Fry, J. W. (1977). *Quality or Quantity? A Discussion of a Pilot Project in Designing State Funding Formulas Based on Performance-Quality Rather than Activity-Quantity.* Gallatin, Tenn: Volunteer State Community College.

Attempt to use performance based criteria across campuses. (student learning) no results only

planning details.

Gross, F. M. (1982). *Formula Budgeting For Higher Education: State Practices in 1979-80.* Boulder, Colorado: National Center for Higher Education Management Systems.

Tennessee: Academic Support-3% for research universities, 1.7% for regional universities and 0.8% for community colleges of the total amount calculated for instruction. Student services: a fixed rate ($142) per headcount student was used to calculate the request amount for student services. In addition, a fixed amount ($40,000 for community colleges and $300,000 for regional universities) for intercollegiate athletics was included. Public Service: A fixed allowance per institution was permitted according to the following schedule: Community colleges/technical institutes($50,000 for FTE enrollments up to 2,500 and $75,000 for FTE enrollments over 2,500). Universities ($100,000 or 0.5 percent of total E&G budget request). Research (Universities Only): Fifty percent was distributed in proportion to the amount budgeted by each institution for research the prior year and Fifty percent was distributed on the basis of sponsored research awards to each institution.

Developmental Studies: Community colleges and technical institutes receive an allowance of one percent of total E&G expenditures. Regional universities receive an allowance of 0.5 percent of total E&G expenditures.

Institutional support: Community colleges ($100,000 plus $190 per FTE student). Universities($230 per FTE).

Nonformula Components: Funds for staff benefits, student aid, and utilities were based on current expenditures plus an inflation adjustment.

Instructional-Evaluation Allowance: Institutions were allowed to add to the next E&G

expenditure request an amount up to two percent of their total E&G expenditures, based on numerical ratings of five instructional variables. (For example, 80 out of 100 maximum points would result in 80 percent of the 2 percent allowance.) The five instruction-evaluation variables were:

a. Proportion of eligible academic programs accredited (up to 20 points).

b. Performance of graduates on a measure of general educational outcomes (up to 20 points).

c. Performance of graduates on a measure of specialized or major-field outcomes (up to 20 points).

d. Evaluation of instructional programs and services by enrolled students, recent alumni and community employers (up to 20 points).

e. Peer evaluation of academic programs (up to 20 points).

TEXAS: Libraries-based on SCHs as Undergraduate ($2.88), Masters and Professional ($5.80), Law ($15.31) and Doctoral ($24.80). The minimum base was $225,000 plus $9.00 per credit hour for schools with a total credit hour production of 50,000 or less and $450,000 for all other schools.

Organizational Research: The amount recommended was a fixed percentage (70.0) of the result of multiplying an institutional complexity factor times the sum of faculty salaries (for each year of the biennium) plus five percent of the total expenditures for sponsored research during the base year. The institutional complexity factor was calculated by dividing total weighted FTE students (during the base year) by total FTE students, where total enrollments for three levels of instruction (undergraduate, master's and doctoral) and three graduate academic groupings (science and engineering, teacher education, and all other) were weighted to reflect instructional-program complexity.

Custodial Services: Total square feet of E&G building space times a given rate ($0.5358).

INDIANA: recognizes: Enrollment increases or declines, Cost increases (salaries, utilities and so forth), New programs or changes in existing programs, special needs for quality improvement, increases in tuition and fees.

VIRGINIA: Instruction-Projected FTE students by level and discipline divided by student-faculty ratios (Teaching and Research); Instructional Administration as 1 per 20 teaching and research positions for doctoral institutions/1 per 35 teaching and research positions for regional colleges/1 per 25 teaching positions for community colleges; Support (Classified) Staff-1 per 4 teaching and research positions for doctoral institutions/1 per 8 teaching and research positions for regional and community colleges.

Library: 9 plus 1 per 400 FTE undergraduate and 1 per 100 FTE graduate students plus 1 per 35 FTE faculty for doctoral institutions. 9 plus 1 per 400 FTE students plus per 40 FTE faculty for comprehensive colleges. 3 plus 1 per 500 FTE students plus 1 per 50 FTE faculty for community colleges.

Institutional Support: Support Staff-4 plus 22.5 per 100 FTE faculty for all four-year institutions; 4 plus 10.5 per 1,000 FTE students for community colleges. Administrative Staff-3 plus 2.75 per 1,000 FTE students for doctoral institutions; 3 plus 3 per 1,000 FTE students for comprehensive colleges; 3 plus 4 per 1,000 FTE students for community colleges.

WISCONSIN: Of particular interest was the method used to provide funding increments for enrollment increases. The suspended formula had assumed that the total funding needs of instruction, academic support and student services varied directly and in a linear fashion with student enrollment changes. The new approach used a

variable- and fixed-cost differentiation for these three areas. Specifically, 7 percent of instruction, 32 percent of academic support, and 35 percent of student-service costs were found to be fixed and, therefore, not subject to adjustment due to enrollment fluctuations.

Gross, F. M. (1979). *Formula Budgeting and the Financing of Public Higher Education: Panacea or Nemesis for the 1980s?.* Tallahassee, Fl: Florida State University, Association for Institutional Research. ed 178 004

The use of formulas during periods of steady or declining enrollments will always promote the formula numbers game unless funding approaches can be found which remove enrollment attributes as institutional resource predictors.

Gross, F. M. (1973). *A comparative analysis of the existing budget formulas used for justifying budget requests or allocating funds for the operating expenses of state-supported colleges and universities.* Doctoral Dissertation, University of Tennessee, Knoxville.

Instruction and departmental research: Includes compensation for academic administration, faculty members, supporting staff and clerical employees; instructional and laboratory expenses; travel; office supplies and equipment; faculty enrichment and recruiting; and other expenses for departments, colleges and schools for instructional and unsponsored research.

Organized activities related to instruction: Includes all expenditures for activities operated in connection with the instructional departments and conducted primarily to give professional training to students, such as agriculture college creameries and demonstration schools for teacher education.

Libraries: Includes the expenses for all separately organized libraries, both general and

departmental, consisting of expenditures, salaries, wages and other operating expenses such as costs of procuring and maintaining the collections.

General administration and general expenses: Includes all expenditures for the general executive and administrative offices which serve the institution as a whole, as well as other expenditures of a general character not related to any specific division of the institution which is budgeted separately.

Student services: includes all expenditures for administering undergraduate and graduate admission activities, processing and maintenance of student records and reports, student registration, counseling and placement.

Organized research: Includes all expenditures for research projects which are organized, budgeted, or financed separately for the instructional departments.

Extension and public service: Includes all expenditures for activities designated primarily to serve the general public, including correspondence courses, adult study courses, public lectures, institutes, workshops, demonstrating centers, package libraries, museums, and similar activities.

Physical plant operation and maintenance: Includes all expenditures for salaries, wages, supplies, materials, fuel and utilities, and other expenses in connection with the day-to-day operation of the physical plant and its maintenance.

Gruson, Ed. S. (1979). *State Regulation of Higher Education in a Period of Decline.* Cambridge, Massachusetts: Sloan Commission on Government and Higher Education.

John Pittinger, when Secretary of education in Pennsylvania, asserted that:"...education is always in politics. I concerns money and power, and those are what politicians fight about. I see no advantage in concealing from the public the fact that educational decisions are in fact political

decisions and that support for education requires political skills."

Proposes a base plus enrollment predicated on FTE by degree type.

Huff, R. A. (1975). *Undergirding program decisions with information and unit costs: an approach to differential funding for statewide systems of postsecondary educational institutions.* Paper presented at a Seminar for State Leaders in Postsecondary Education. Hartford, Connecticut.

Robert A. Huff was executive secretary, New Mexico Board of Educational finance.

Planning Center 1: Lower division Biology, Physical Science, Fine Arts , Home Economics.

Planning Center 2: Lower Division business, Business Education, Communications, Languages.

Planning Center 3: Lower Division Education, Health, Physical Education, Letters, Library Science, Mathematics, Psychology, Social Welfare, Social Science, Interdisciplinary.

Planning Center 4: Upper division Biology, Physical Science, Fine Arts , Home Economics.

Planning Center 5: Upper Division business, Business Education, Communications, Languages.

Planning Center 6: Upper Division Education, Health, Physical Education, Letters, Library Science, Mathematics, Psychology, Social Welfare, Social Science, Interdisciplinary.

Planning Center 7: Graduate Division Biology, Physical Sciences, Fine Arts.

Planning Center 8: Graduate Division Business, Business Education, Communications.

Planning Center 9: Graduate Division Education, Letters, Library Science, Mathematics, Psychology , Social Sciences.

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Planning Center	Student/faculty Ratio	Dollars Per Faculty Position	Secretarial Support
1	18	15,000	3,000+500/fac
2	20	15,000	3,000+500/fac
3	24	15,000	3,000+700/fac
4	15	18,000	3,000+700/fac
5	18	17,000	3,000+700/fac
6	20	17,000	3,000+800/fac
7	10	20,000	800/fac
8	12	19,000	900/fac
9	15	19,000	1,000/fac
	Support Services		
1	1000+200/fac+2/sch		
2	1000+200/fac+1.5/sch		
3	1000+200/fac+1/sch		
4	1000+300/fac+3/sch		
5	1000+300/fac+2/sch		
6	1000+300/fac+1.5/sch		
7	1000+400/fac+4/sch		
8	1000+400/fac+3/sch		
9	1000+400/fac+2/sch		

Summer Session: 5% of instructional salaries

Student Services: 50,000+1/sch

Computing: 20,000+0.30/sch

Fiscal Operations: 30,000+3% of instructional salaries

Physical Plant: 190,000+5% of instructional salaries

Logistical Services: 80,000+0.5/sch

Jones, P. D. (1984). Innovations in State Level Formulas: Established and Emerging Trends. In: R. A. Wilson (Ed.), *Innovating and Adapting: New Financing Strategies for Colleges and Universities.* Tucson: University of Arizona, Center for the Study of Higher Education, 1-7.

> formulas consist of procedures that have been worked out for handling a particular decision so that such decisions won't have to be treated each time they (re)occur. In short, formulas serve as a specific set of procedures that indicate what factors (variables) will be considered in calculating budget requests and that indicate *how* those factors will be incorporated into the consideration (what coefficients will be attached, what the mathematical forms of the relationships will be, etc.). In many ways formulas are better viewed as procedures for carrying out decisions made at the time the formulas were constructed.

Components: The General (Multi-Purpose) Component, Special Purpose Component.

Special Purpose Component: economic development (expanding and upgrading engineering and other technical capacities), institutional and program quality and student learning and performance.

Kerr, C. (1983). Survival in the 1980s. In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission, and Financing Options.* Tucson, Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, 1-12.

P. 5: A recent national reports starts out by saying that the "greatest danger to quality in higher education in the 1980s is 'cuts across the board'" (National Commission on Higher Education

Issued (1982). To Strengthen Quality in Higher Education. Washington, D.C.: American Council on Education, p. 1).

Lassiter, R. L. (1983). *Funding and budgeting formulas and the availability and allocation of resources to public universities.* Paper presented at the fifty-third annual conference of the Southern Economic Association, Washington, DC, November 20, 1983, ED 255 126.

p.1-2: Even a cursory examination of the traditional economics journals will reveal that surprisingly little attention has been given by economists to the provision and allocation of resources in the higher education industry. Most of the efforts by economists seems to have been expended in analyzing the outputs of higher education, chiefly as the creation of human capital and knowledge. However, the underlying production functions and their attendant costs seem to have seen largely ignored in "mainstream" economics.

P. 10: The search for an ideal funding formula might be likened to the pursuit of the Fountain of Youth-it has never been found nor does it exist. While recognizing that there is not a formula which is ideal for all applications, models can be developed which are more useful and equitable than the ones currently in use.

p. 27: Ideally, formulas would be based on standardized workload measures which reflect the resource requirements for the attainment or maintenance of the level of quality specified in the missions of the institutions. such a procedure will provide explicit recognition of the impact of appropriations/allocation decisions and inflation on the institutions and programs. While some have feared to submit requests to legislatures which are "ridiculously" high relative to current appropriations, current procedures in some states

may lead legislators to the false conclusion that they are maintaining some historically based levels of quality. Allocation decisions among public higher institutions, prisons, K-12 public education, public safety, etc., by legislatures must be based on "full disclosure" of the costs among the competing claims on public resources. Many of these claims are "workload" based, and in the case of the penal systems, the "workloads" have been defined by federal courts.

Legislative Commission of the Legislative Counsel Bureau, State of Nevada (1986). *Study of funding of higher education in Nevada.* Carson City, Nevada: Author ED 301 085.

Formula Expansion for Support Services.

3-tiered formula:

A fixed number of professional and classified personnel for each college to provide support for the vice president for academic affairs and the academic deans' offices. Two professional and one classified position would be provided for the vice-president plus one professional and one classified position for each college/school.

The number of positions authorized to support library operations (excluding book acquisitions) is determined based on the number of library volumes at each campus. 0-500,000 volumes (50 positions at $32,000 per position including support funding). Every additional 16,000 volumes-1 position at $32,000 including support funding. Books and periodicals are funded at 6.5% for each department.

The remaining academic support functions would be based on a percentage of each

campus' instructional budget.

Reduce student/faculty ratios to 24:1.

Developmental programs are designed to prepare students to succeed in college and give them the opportunity to achieve academic or occupational goals.

Developmental student/faculty ratios be 15:1.

One graduate assistantship for every 5 FTE graduate students and one graduate assistantship for every 3.3 FTE doctoral students at a salary of $8,800 per year.

5% of equipment budget for equipment replacement.

An appropriate method of amortizing instructional and research equipment over time and providing for its maintenance needs to be developed.

An appropriate allotment for equipping new positions needs to be developed so that each new position is equipped properly at time of hiring. $1,605 for administrative and $2,179 for clerical.

40% of the faculty workload in the regular school year being devoted to research and public service.

Budget 30% at universities for summer school. Year-round funding needs to be considered.

Student Services: Head count + FTE student enrollment up to 10,000: divide by 300; over 10,000 divide by 400:Divide the number of resident students by 100 and form the sum.

Library Acquisitions: 125*FTE Faculty+20*FTE Students + 610 * no of Baccalaureate or Associate Degree Programs + 10,000 * Masters with not doctoral program + Masters with doctoral program * 3750 + Doctoral Program * 31250. Multiply number of volumes by acquisition rate of 5%. Estimate cost at $30 per volume.

Lewis, G. A. (1981). *Bibliographic Materials Fund Allocation Formula In Use At Radford University.* Radford, Virginia: Radford College. ED 207 547.

Variable A: Undergraduate credit-person hours. Louisiana calls this SCH's.

Variable B: Number of declared undergraduate majors.

Variable C: Graduate Credit-Person Hours.

Variable D: Number of graduate majors.

Variable E: Average Cost Weighting. This variable is based on the average cost per item for books in the various academic disciplines. The source of this information is **The Bowker Annual**. Index values for each subject area are computed by dividing each average price listed by the largest average price listed.

Variable F: Publishing Output Weighting-an index value which reflects the book publishing output of the various academic disciplines. The source for the raw data of this variable is the table "American Book Title Output" in the Bowker Annual. Index values ranging from 1.2 to 1.8 were established to correspond to the data in the tables.

Variable G: Importance of Books over Serials. This new variable has just been added to the formula for the first time for fiscal year 1981-82. since serials funding will be increased overall for this new fiscal year, Variable G attempts to decrease funding selectively by departments for those for whom serials are more important than monographs. Index values ranging from .5 to 1 were selected by the Materials Selection Committee based on conversations with department chairmen, and the Committee's knowledge of library use in subject fields.

Variable H: Local Library Use. This new variable adjusts the formula for use of the library. Index values ranging from .5 to 2 are selected by the Materials selection committee based on examination of circulation data and the experiences of library staff.

INDEX VALUE (V)= [(A+B)+2(C+D)]EFGH

NOTE: This index is calculated for each department.

After the allocation index values have been computed for each fund, these values must be converted to percentages for application to funding. the index values are converted by dividing each fund's index value by the total of all index values. **This is used as a ratio to allocate proportions to departments against the total budget.**

Louisiana Board of Regents (1991). *Summary of Higher Education Financial Information for Fiscal Year 1991-1992.* Baton Rouge: Author

Louisiana Institutions Categorized by SREB System

Doctoral I	Louisiana State University at Baton Rouge
Doctoral II	University of Southwestern Louisiana
Doctoral III	Grambling State University
	Louisiana Tech University
	Northeast Louisiana University
	University of New Orleans
Master's II	McNeese State University
	Nicholls State University
	Northwestern State University

	Southeastern Louisiana University
	Louisiana State University at Shreveport
	Southern University at Baton rouge
	southern University at New Orleans
Two-Year	Delgardo Community College
	Louisiana State University at Alexandria
	Louisiana State University at Eunice
	Southern University at Shreveport
Specialized	Paul M. Hebert Law Center
	Louisiana State University Medical Center

One FTE undergraduate student is equal to fifteen (15) semester credit hours.

One FTE graduate and first professional student is equal to twelve (12) semester credit hours.

One headcount student is equal to a student taking any number of semester credit hours, whether it is one semester credit course or three.

Louisiana Board of Regents (1980). *STATE APPROPRIATION FORMULA.* Baton Rouge, Louisiana: Author.

BASIC FACTOR CHART VALUE PER STUDENT CREDIT HOUR

BASIC FACTOR CHART

INSTRUCTION, RESEARCH, ACADEMIC AND ALL OTHER SUPPORT

STUDENT LEVEL	LOWER COST AREA	HIGHER COST AREA
LOWER LEVEL UNDERGRADUATE (0-59 semester hours)	41.84	54.61
UPPER LEVEL UNDERGRADUATE (60 semester hours to graduation)	56.73	74.75
NURSING-LLU		113.73
NURSING-ULU		144.43
NURSING-MASTERS		240.15
MASTERS (Accepted for Graduate Study; Masters and Masters plus thirty)	186.54	235.15

STUDENT LEVEL	LOWER COST AREA	HIGHER COST AREA
SPECIALIST PROFESSIONAL (students formally enrolled in an Education Specialist Program. The higher value assigned to this level of instruction reflects the Board of Regents' dedication to the improvement of teachers in Louisiana).	209.14	
DOCTORATE (Formally admitted to study toward the Doctorate)	514.11	641.86
LAW		123.59

High Cost areas are listed below. All remaining HEGIS taxonomy codes are valued at the lower cost rate.

Agriculture	Allied Health & Pharmacy	Engineering	Fine Arts & Architecture
Law	Nursing	Sciences	Technology

SCH credit earned in courses taught out of state is to be counted for student classification purposes and also is to be included in a separate section on the SCH production report for formula purposes. Records must be kept by course and location and are to indicate the number of students enrolled and the SCHs produced for each such course. Such records must be submitted to the Board of Regents no later than 30 days following the completion of the course. The values contained in the Basic Factor Chart are based on state support of 75% of E&G

expenditures. Also, the values on the chart recognize fixed costs by providing a base support for all institutions.

CATEGORIES:

Instruction

Research

Public Service

Academic Support

Libraries

Student Services

Insitituional Support

Scholarships and Fellowships

Operation and Maintenance of Plant

Maryland State Board for Higher Education (1982). *FY 1984 Consolidated Capital and Operating Budget for Higher Education.* Bethesda, Maryland: Author. p. 29.

SBHE Instructional Program Budget Guidelines

Instruction Method	Lower Division	Upper Division	Graduate	Graduate Research
LOW: Area Studies, Business, Computer Science, Interdisciplinary Studies	1.0	3.0	6.0	8.0
Medium-Low: Agriculture, Communication, Foreign Language, Health, Home Economics, Letters, Mathematics, Psychology, Social Science	1.5	4.5	9.0	12.0
Medium-High: Biology, Education, Engineering, fine Arts, Physical Sciences	2.0	6.0	12.0	16.0
High: Architecture, Library Science	2.5	7.5	15.0	20.0

Meeth, L. Richard (1975). *Government Funding Policies and Nontraditional Programs.* Washington, D.C.: Institute for Educational Leadership.

"The credit-hour requirement is only one of several that place nontraditional programs at a disadvantage compared to traditional educational efforts. Other restrictive measures–some

affecting programs in just one state, some in several--include the following.

Basing funding for full time equivalent faculty on full time equivalent students, a practice that overlooks workload realities in some nontraditional programs. Example: In the external degree program at Empire State College in New York, which enrolls large numbers of part-time students, it has been found that almost as much faculty time and effort is needed per part-time student as per full time students. Consequently, funding is not adequate to handle the real faculty workload. p. 6-7

The survey used to document the funding and approval problems of nontraditional programs also produced a number of suggestions for solutions. Largely these centered on restructuring formulas and guidelines to take into account the special features and purposes of nontraditional education. Suggestions ranged from adding flat or percentage increments specifically for nontraditional program development to finding a more equitable unit of measure than the credit hour. Possible alternatives to the credit-hour yardstick include student-faculty contact hours, value-added achievement rates (which measure the "amount" of learning), and "Professional Service Units" (which measures a faculty member's complete academic workload rather than work which is directly linked to student credit hours). p. 7

Replace formulas and guidelines with a system of program budgeting that allows all programs to justify their existence and set their priorities by indicating the money necessary to carry out specific activities. p. 8

The irony of budget formulas is that in many instances they work against the very purposes they were designed to serve, notably the improvement of educational services to society. such improvement is not likely to occur without a continuous search for better ways to teach and learn. And that search is the distinctive mission of nontraditional education. p. 8

McClintock, D. L. (1980). *FORMULA BUDGETING: An Approach to Facilities Funding.* Washington, D.C.: Association of Physical Plant Administrators of Universities and Colleges.

David L. McClintock, was Assistant to the Vice President for Finance at Colorado State University and Chairman of the Colorado Association of Public College and University Presidents Physical Plant Formula Financing Subcommittee.

NOTE: SEE Dr. Harvey H. Kaiser's *Mortgaging the Future: The cost of Deferring Maintenance,* Washington, D.C.: Association of Physical Plant Administrators of Universities and Colleges, Eleven Dupont Circle, Suite 250 (1979).

William R. Dickson, Vice President for Professional Affairs, APPAUC, in the prologue says: "...one inherent danger is that the formula budgeting approach, if relied on exclusively, may ignore the many human factors that influence the distribution of resources in an organization. A good formula budget incorporates these human factors. Another problem is the non-comparability of various units that, on the surface, may appear similar. Even within a state system, there may be significant differences between one institution and another, requiring a deviation from standard formula. Budget formulas used blindly can tend to force uniformity of operation even when conformity is not in the best interest of the institution. Budget formulas do not typically recognize basic differences among institutions which may lead to different budget patterns nor do they normally allow much room for differences in management style. This argues strongly for developing as simple a formula as possible in order to minimize the number of decision variables available to budget analysis.

...It should also be pointed out that budget formulas based on historical expenditure patterns will tend to perpetuate whatever inequities exist within the historical data."

p.2: A formula might be considered to be a good formula if it is simple, flexible, sensitive to changing conditions, is based on reasonable and adequate data, and does the job intended of it.

NOTE: Kraft, Walter W. (1950). Budgeting for Maintenance Should be Based on Present Replacement Cost, *College and University Business, 8,* 5 (Landmark article on formula budgeting).

KRAFT: "(i)n many instances buildings have been permitted to deteriorate to the point at which the repair item becomes a remodelling item. this places a great burden on the budget, is wasteful, and may encroach upon the instructional budget...(i)t was evident that many building repairs were made in more or less temporary manner, which contributed to a more rapid deterioration of the building. Often money was allocated for building maintenance after all other money requests had been provided for." He dismissed methods based on gross square feet of building area or on cubic feet of building volume because of the wide variety of building types in use. He argued that the cost of maintenance will vary markedly over time and among building types so that neither area nor volume formulas could adequately take those differences into account.

KRAFT FORMULA: Annual **Maintenance Budget=Maintenance Cost Factor x Current Replacement Cost of the Building(s)**

Kraft identified three construction types each with its own Maintenance Cost Factor as follows: Wood-frame construction (1.75%), Masonry-wood construction (1.30%), Masonry-concrete or masonry-steel with concrete floors (1.10%).

NOTE: Badgett, W. H. (1964). *A Formula Approach to Physical Plant Budgeting,* Texas A&M University.

Number of Custodial FTE's=(Gross Square Feed Maintained)/14000

Custodial Supplies Budget=10% of Custodial Salary Budget

Ground Maintenance Budget=75% of [A(number of intensely maintained and used acres)+B(number of moderately maintained and used acres)+C(Number of minimally maintained and used acres)]+25% of [D(number of FTE students)+E(Number of FTE employees)]

The committee left the specification of the three dollars per acre measures (A, B and C), the two dollars per FTE measures (D an E), and the development of a rationale for the 75%/25% split as matters for future study.

NOTE: Thomas, Wm. (1968). *Financing of Higher Education in Public Institutions in Texas.* Wichita Falls, Texas: School of Business Administration, Midwestern University.

1 FTE physical plant employee per 10,000 gross square feet of building space.

148 FTE physical plant employees are required for every 10,000 FTE student enrollment

10,000 physical plant administration and general services budget is required for every six FTE physical plant employees.

NOTE: *CB Report, Vol XIII,* Number 1-2 (1978). Coordinating Board Recommended Formulas.

Campus Security Services=A+B

A=4.5SW(FTSW+FTEE), for the first 8,000(FTSE+FTEE) and, B=3.8SW(FTSE+FTEE) for all (FTSE+FTEE) above 8,000 where SW is the average hourly earnings for services, FTSE if the full time equivalent student enrollment; FTEE is the total full time equivalent employees.

The Texas system formulas have been refined considerably since first developed in the early 1960's. They provide an excellent example of the disaggregated approach where specific formulas are developed separately for each element of the physical plant budget.

NOTE: Greene, Calvin C. (1970). *Budgeting Standards for Physical Plant Division*

Operations State University System of Florida. University of Florida, Physical Plant Division.

Minimum administration: Department director, assistant director, draftsman, 2 secretaries, accounting clerk, clerk typist. Additional staff: 1 assistant director at 2,000,000 gross square feet, 1 assistant director at 4,000,000 gross square feet, 1 engineer at 500,000 gross square feet, 1 engineer for each additional 750,000 gross square feet, 1 draftsman at 1,000,000 gross square feet, 1 additional draftsman for each additional 1,000,000 gross square feet, 1 additional FTE position for each 5000,000 gross square feet. **Administration expense budget of $0.01 per gross square foot.**

Ground Maintenance: Basic complement: 1 Ground maintenance superintendent and 14FTE ground keeper for up to 5000,000 total gross square feet of space. ! FTE ground keeper for each 45,000 gross square feet, 1 ground keeping supervisor for each 15 FTE ground keepers and 1 assistant superintendent for each 5 supervisors. Supplies budget of from $0.025 to $0.055 per gross square foot depending upon climate, soil conditions and so forth.

Campus Security: The basic security force is as follows for institutions up to 800,000 gross square feet of space: 1 superintendent and 10FTE security officers of various ranks. As the institution grows, additional positions are added as follows.

800,001 to 1,000,000 GSF	1 FTE per 80,000 GSF
1,000,001 to 2,000,000 GSF	1 FTE per 90,000 GSF
2,000,001 to 3,000,000 GSF	1 FTE per 100,000 GSF
3,000,001 to 4,000,000 GSF	1 FTE per 110,000 GSF
4,000,001 to 5,000,000 GSF	1 FTE per 120,000 GSF
5,000,001 to 6,000,000 GSF	1 FTE per 130,000 GSF
6,000,001 to 7,000,000 GSF	1 FTE per 140,000 GSF
7,000,001 and up GSF	1 FTE per 150,000 GSF

The model also allows an expense budget of $0.006 per gross square foot.

NOTE: Curry, D. J. (1970). *A Model Budget Analysis System For Plant Operation And Maintenance,* Olympia, Washington: Office of Interinstitutional Business Studies, The Evergreen State College.

Seven major functions were included in the definition of plant operations: Building Maintenance, Janitorial Services, Ground Maintenance, Utilities, Administration, Police, Fire and Safety, Refuse Disposal and Trucking.

Custodial Services: 1 FTE Janitor for every 20,000 GSF, 1 FTE window washer for every 350,000 GSF, 1 FTE relief worker for every 12 formula FTE workers and 1 FTE supervisor for every 20 FTE employees. An allowance for equipment replacement was computed by allowing $0.0092 per gross square foot maintained per year.

Ground Maintenance: supplies budget was computed as 10% of the building maintenance

allowance.

NOTE: Weber, G. O. and G. O. Weber (1972). *Formula Budgeting for Physical Plants of Universities and Colleges.* University of Maryland,

Hours of Operation Curve: Multiplier=$0.03H+0.00023H^2+0.017LN(H)+0.0000006H^3$; where H is hours of use per week.

Intensity of Use Line: Multiplier=1.225-0.0015 G; where G is the number of gross square feet per FTE student.

Intensity of Landscape Development Line: Multiplier=0.75+L; where L=decimal fraction of land covered by buildings.

Optimum basic budget to which multipliers are applied: FTE=GSF/8,000 and Annual Budget for the 4 Basic Functions=FTE x S x MSF where: GSF=gross square feet of space operated and maintained by the physical plant department; FTE is the number of FTE physical plant employees required to perform the four basic physical plant functions; S is the average annual salary and benefits; MSF is a factor for computing the materials and supplies component of the physical plant budget measured as a percentage of the total salaries and wages budget.

Divide the total FTE (adjusted for Hours of Operation and Intensity of Use) into the four functional categories: Administration 5%; Building Maintenance 25%; Ground Maintenance 10% and Custodial Services 60%. Adjust the ground maintenance FTE for Intensity of Landscape development. Compute the budget for materials and supplies for each group by multiplying each of the four salary budgets by the following supply factors: Administration 8.7%; building maintenance 42.7%; ground maintenance 42.9% and custodial services 11.1%.

NOTE: Chancellor's Office, *The California State University and Colleges (1974). Budget Formulas and Standards Manual.* Los Angeles, California: Budget Planning and Administration Department, Chancellor's Office, the California State University and Colleges.

Campus security: The minimum security force is defined to be 6 FTE regardless of size. Security officer positions are determined as follows (including 1 FTE supervisor): 1 FTE for every 2,000 headcount enrollment for the first 10,000 headcount students; 1 FTE for every 3,000 headcount enrollment for headcount students above the first 10,000; 1 FTE for every 700,000 gsf of space; 1 FTE for every 150 acres up to a maximum of 2 FTE.

Campus security clerical positions: 0.5 FTE for headcount enrollments up to 10,000 students; 1 FTE for headcount enrollments above 10,000.

Allow 1 FTE additional groundman for every 12 FTE groundmen to allow for sick leave and vacation coverage.

McKeown, M. P. & Layzell, D. T. (1992). *STATE FUNDING FORMULAS FOR HIGHER EDUCATION: Trends and Issues,* Paper Presented at the 1992 Annual ASHE Conference, Minneapolis, Minnesota October, 1992

The use of state funding formulas or guidelines for public higher education will reach the half-century mark in the 1990s. Despite this long history, it is clear that the only point upon which experts would agree is that there is no perfect formula. Originally envisioned as simply a means to distribute public funds for higher education in a rational and equitable manner, funding formulas have evolved over time into complicated methods with multiple purposes and outcomes. Although funding formulas provide some rationale and continuity in allocating state funds for higher education, users design and utilize formulas for many purposes. And while the genesis of

funding formulas may lie in rational public policy formation, the outcome may not. Formulas are products of political processes, which means they result from compromise. Indeed, as noted by one observer of state higher education funding processes, "formula budgeting in the abstract, is neither good or bad, but there are good formulas and bad formulas" (Caruthers 1989, p. 1)

State governments provide substantial support for higher education every year. According to data collected by the Center for Higher Education at Illinois State University, states appropriated $40.1 billion in state tax funds for higher education operating expenditures in fiscal year 1992 (Hines 1991). According to figures compiled by the National Conference of State Legislatures (NCSL), on average, state spending on higher education comprised 13 percent of total state general fund spending in FY 1992 (Eckl, Hutchison, and Snell 1991). This was second only to state spending on K-12 education (36.9%).

Without a doubt, however, state resources for higher education have become scarcer in recent years. Data from an annual survey of legislative fiscal officers conducted by the NCSL indicate that while the average percent change in total state general fund budgets between FY 1992 and FY 1993 was 4.8 percent, the average change in state general fund appropriations for higher education was 1.6 percent (Eckl, Hutchison, & Snell 1992). NCSL data from this same survey indicate that the annual percent change in state general fund appropriations for higher education was less than the annual percent change in total state general fund budgets in three of the past four years. According to the NCSL data and other reports, much of higher education's declining share is due to increased demands on state budgets by health programs (e.g., Medicaid) and corrections (prisons) programs. Thus, for those states employing funding formulas or guidelines, the importance of these formulas in the allocation of scarce(r) state resources has been magnified in recent years.

The objective of this study was threefold: (1) to determine the recent status of funding

formula use among the states and to examine changes in formula usage over the last eight years; (2) to determine the extent to which funding formulas were used by those states employing formulas or guidelines; and (3) to examine if and how states were using innovations in funding formulas such as incentive funding and quality/outcome measures.

State Funding Formulas and The Funding Literature

The Development of Funding Formulas

The terms "funding formulas" or "guidelines" refer to a mathematical basis for allocating dollars to institutions of higher education using a set of rates, ratios, and/or percentages derived from cost studies and peer analyses. Generally, states have provided operating funds using expenditure categories developed by the National Association of College and University Business Officers (NACUBO): Instruction, Research, Public Service, Academic Support, Student Services, Institutional Support, Operation and Maintenance of Plant, and Scholarships & Fellowships. There are two other NACUBO expenditure categories, Auxiliary Enterprises and Hospitals, but these typically are not state funded and thus are excluded from funding formulas (McKeown 1989). States use funding formulas for both the request and allocation of state resources to public universities, state colleges, community colleges and vocational institutes, and private institutions. Although there are similarities among states as to formula use, no two state funding formulas are exactly the same in structure (Caruthers 1989). States can have as few or as many formulas and funding categories as desired, and can use their formula for part or all of the total higher education budget.

A recent survey of 44 state university system offices found that of 37 respondents, 7 indicated that they used a formula, 13 indicated that they used an incremental method of funding, and 17 indicated that they used a combination of formula and incremental budgeting (AASCU 1991). The fact that the majority of the respondents were funded in an incremental manner for all

or a portion of their budget may be indicative of institutional funding strategies aimed at protecting base budgets. However, all 7 formula systems and 9 of the combination formula/incremental systems indicated that between 50 percent and 100 percent of their education and general (E&G) expenditures were covered by a formula. This includes the NACUBO expenditure categories such as instruction, academic support (including libraries), and physical plant operations and maintenance (O&M). In addition, many systems indicated that enrollment growth was funded through a formula.

Caruthers (1989) notes that formulas have undergone constant evolution since their inception. He identified four long-term trends in formula use and development:

More detailed budget categories (e.g., more subcategories of instruction)

More budget control and monitoring of formula categories by state boards of higher education and legislative/ executive budget staff in response to increased demands for accountability

More non-formula components such as categorical grants for equipment and economic development and incentives for quality improvement

Lessening the importance of enrollments in formulas in response to anticipated enrollment declines

The trend toward more detailed budget categories within funding formulas is in part the result of the perennial concern that formulas fail to fully recognize differences among public colleges and universities through the reliance on institutional averages (e.g., average costs). The trend toward non-formula components may reflect a recognition among policy makers that some state higher education policy objectives may be met more effectively outside of the funding formula approach.

The Funding Formula Literature

In general, the treatment of higher education funding formulas in the literature has been primarily descriptive or mechanical in nature, unlike the relatively sophisticated analyses of elementary-secondary education funding formulas in the education finance literature. This may be due to the fact that such analyses have been used as the basis for challenging the equity and/or constitutionality of state support for K-12 education in the courts. As noted by McKeown, "The issues of student and taxpayer equity are not addressed very often in the literature of higher education finance, and certainly are not driving forces in state funding formulas" (1989, pp. 102-103). It should be noted that state higher education funding formulas have taken on at least some legal significance in recent years as the federal government initiated higher education discrimination litigation in several states. All but one of the states against which a federal discrimination case was filed was a formula state, and some have argued that in these states funding formulas may serve to perpetuate past inequities that existed among previously segregated institutions of higher education (McKeown 1986).

The first significant work on funding formulas was conducted in the early 1960s by James Miller at the University of Michigan. Miller defined formulas as:

> "an objective procedure for estimating the future budgetary requirements of a college or university through the manipulation of objective data about future programs, and relationships between programs and costs, in such a way as to derive an estimate of future costs." (1964, p.6)

He also noted that formulas had been developed as a means of achieving a sense of adequacy, stability, and predictability in institutional funding levels.

In the thirty years since Miller's work, the literature on state higher education funding formulas has become voluminous. Interestingly, as the popularity of and experience in formula

use among the states also grew, the perception in the literature of funding formulas as "objective procedures" shifted more to one of a mix of analytics and politics (Jones 1984 & Caruthers 1989). Caruthers defines a budget formula as a, "... subjective judgment expressed in mathematical terms ... which tends to be regarded as an objective evaluation ... when applied over a long period of time in a relatively mechanical way" (p. 3). Despite the volume of literature on this topic, one observer wryly notes:

> " one senses an increasing lack of clarity regarding what formulas are designed to do, what their characteristics are, and how they are supposed to relate to state policy. Instead the focus has shifted to the mechanistic ... There is little evidence in the literature of a fundamental reassessment of formulas..." (Jones 1984, p. 46).

In short, despite concerns about current formula usage, researchers and states have generally attempted to deal with these problems in a disjointed fashion.

Data Sources and Methodology

This study is based on data collected by mail and telephone surveys of the state governing or coordinating boards for higher education in 1984, 1988, and 1992. The most recent survey was sent directly to the designated State Higher Education Finance Officer (SHEFO) in each state, the District of Columbia, and Puerto Rico. Survey responses were obtained for all states, D.C., and Puerto Rico. A major caveat in this survey is that what one state considers a formula or guideline may not be considered as such by another state or even by individuals within the same state. Indeed, in some states one respondent to the survey replied that their state did not use formulas while another respondent from the same state stated they did.

Aside from determining whether or not a state used a funding formula for part or all its higher education budget, the most recent survey collected information on a broad range of issues related to funding formulas including:

- How long the state had used funding formulas or guidelines
- For what purpose(s) and sectors of higher education formulas were used
- How formulas were developed
- If the formula were under revision or was scheduled to be revised in the near future
- If peer data were used in formulas and how peers were developed
- If incentive funding (e.g., matching funds) were used in allocating resources
- If quality/outcome measures were used in formulas

Analysis of the Data

Comparison of Formula Usage in 1984, 1988, and 1992

Overall, the number of states using formulas dropped from 36 in 1984 to 33 in 1988 where it remained in 1992 (see Table 1). However, during this period, some states which had reported not using formulas in 1984 or 1988 (i.e., Idaho) did report using formulas or guidelines in 1992. Further, 18 of the 33 states that reported using formulas or guidelines in 1992 indicated that they were in the process of or planning to revise their funding formulas or guidelines. Of the 18 states that indicated they did not currently use formulas or guidelines, only 1 (Massachusetts) indicated that they were studying the implementation of a funding formula. From a geographic standpoint, of the 33 states that reported formula/guideline usage in 1992 all but five (Connecticut, Illinois, Maryland, Ohio and Puerto Rico) were located either in the Southern/Southeastern U.S. or west of the Mississippi River (see Figure 1).

As shown in Table 1, the number of states using peer data or comparisons in their funding formulas or guidelines grew from 3 in 1984 to 27 in 1988 to 28 in 1992. Of these states, 26 used peer data for salary purposes, 17 for tuition and fee setting, 10 for overall funding levels (e.g., per FTE funding), and 6 for determining funding for libraries. Other peer

data usage included plant O&M funding and faculty credit hour production.

The number of states that reported using quality or outcome measures in funding formulas or guidelines grew from 14 in 1984 to 20 in 1988, but dropped to 10 in 1992. These measures have been used in two ways: by linking levels of appropriations to outcomes; and by setting aside state funds to encourage "desirable" institutional behavior (Hines 1988). The decline from 1988 to 1992 is surprising given the recent emphasis by state policy makers regarding "quality" and assessment. However, some of the states that responded "no" to this question in the 1992 survey indicated that they were in the process of developing quality or outcomes measures.

The 33 states that indicated formula/guideline usage in the budget process also reported on what sectors of higher education (e.g., universities, community colleges, etc.) were affected by the formulas/guidelines (see Table 2). Seven states indicated that all sectors of higher education were funded through one formula while five states indicated that all sectors were formula funded, but each through its own formula. For states that use formulas for certain sectors only, the most frequently reported sector was the universities (20/33) followed by state colleges and community colleges (both 14/33), vocational/technical institutes (5/33) and private institutions (2/33). The breadth of institutional types and funding patterns/arrangements within a state have a significant impact on the extent of formula/guideline usage.

Points in The Budget Process When Funding Formulas are Used

States were asked at what point funding formulas or guidelines were used in the budget process. Virtually all of the states that reported using formulas (32/33) used them in making recommendations to the Governor and/or Legislature. (See Table 3.) Formulas were used less in the development of the Governor's Budget (15/33), legislative staff budget (14/33), and the final

appropriation (16/33). Thirteen states reported using formulas to allocate appropriations.

Seven of the 33 states reported using formulas for mid-year reduction or reversion exercises. Only 3 states (Arkansas, Illinois, and Tennessee) used formulas or guidelines at all 6 stages of the budget and resource allocation process. However, 20 of the 33 states reported using formulas or guidelines at 2 or more of the 6 stages of the budget process.

Formula Approaches and Base Factors

All funding formulas are, in fact, mathematically similar. There is variety among the states in the number of formulas used to allocate funds and in the functional or budget areas for which formulas are used. The formulas reflect one of two approaches: the all-inclusive approach, where the total for the budget area is determined by one calculation; and the itemized approach, where more than one calculation or formula is used in each budget area. Formulas use base factors that can be classified as head count, number of positions, square footage, or full-time equivalent students.

Computational Methods

Three computational methodologies are used in funding formulas: rate per base factor unit (RPBU), percentage of base factor (PBF) and the base factor-position ratio with salary rates (BF-PR/SR). The rate per base factor unit method starts with an estimate of a given base factor, such as credit hours or full-time equivalent students, and then multiplies that factor by a specific unit rate. The unit rates generally have been determined previously by cost studies and can be differentiated by discipline, level of instruction, and type of institution.

The percentage of base factor method assumes that there is a specific relationship between a certain base factor (for example, faculty salaries) and other areas (for example, departmental support services). The percentage of base factor method also can be differentiated (Miller, 1964). The base factor-position ratio with salary rates method is based on a predetermined optimum ratio

between a base factor and the number of personnel, for example, a student-faculty ratio, or credit hour per faculty member ratio. The resulting number of positions determined at each salary level is multiplied by the salary rate for that level, and summed to give a total budgetary requirement. For four-year institutions this is the most complex methodology.

Differentiation

Formulas may differentiate among academic disciplines (e.g., social sciences, education, agriculture), levels of enrollment (freshman and sophomore, junior and senior, masters, professional and doctoral), and type of institution (community college, comprehensive institution, research university). Many states have found it necessary to introduce factors that differentiate among institutions in funding formulas because of differing missions and the mix of program offerings.

The number of formulas used by each of the states in each of the eight functional NACUBO areas is displayed in Table 4. Only eight functional areas are displayed because Hospitals and Auxiliary Enterprises are two areas that are not included in what are called "Educational and General Expenditures" (E and G). E and G expenditures are those that result from expenditures for the three basic missions of colleges and universities: instruction, research, and public service.

Among the states there is some variety in the functional areas for which funding formulas are used. Arkansas has at least one formula for each functional area while West Virginia, on the other hand, has only one basic formula. Missouri has formulas for the areas of Instruction, Academic Support, Institutional Support, and Plant only. Each of the states has at least one computational formula in these four areas. Only Arkansas, Kentucky, Mississippi, Montana, South Carolina, and Virginia have a formula for Scholarships and Fellowships, while Alabama, Arkansas, Florida, Kentucky, South Carolina, and Tennessee are the only states with formulas for

Public Service expenditures.

Texas employs 15 formulas to compute budget requirements for E and G expenditures and South Carolina uses 12. On the other end of the continuum Idaho and Louisiana use only 1 formula. In twelve of the states, more than one computational formula is used to determine Academic Support needs. Since most states have a separate formula for determining Library needs, the Academic Support area, which includes Libraries, Academic Computing Support, and Academic Administration, usually will have expenditure needs computed by more than one formula. Academic Support is an area for which the itemized approach generally is used.

State funding formulas can also provide for equity among institutions depending on how they are structured. Two types of quality achieved through formulas are horizontal equity and vertical equity. Horizontal equity is defined as the equal treatment of equals, while vertical equity is defined as the unequal treatment of unequals.

In the following sections, the use of funding formulas by the states in each of the E & G expenditure categories will be discussed.

Instruction. This category includes all expenditures for credit and non-credit courses; for academic, vocational, technical, and remedial instruction; for remedial and tutorial instruction; and for regular, special, and extension sessions. Excluded are expenditures for academic administration when the primary assignment is administration, i.e., deans (NACUBO, 1988).

Each of the states that uses formulas has at least one formula for instructional allocations. Summary information on the instruction formulas used by the states is displayed in Table 5. Since the instruction program is the major component of expenditures at institutions of higher education, formulas for this activity are quite complex. Most states provide differential funding for activities within the instruction program to recognize differences in costs by level of instruction and among academic disciplines.

In the formula(s) for instruction, the majority of the states recognize differences in institutional roles and missions, in the ix of classes by level and by academic discipline, and in teaching method. Explicitly, the states have attempted to distribute in an equitable manner state funds for the instructional operations of public institutions within the state.

Since these formula allocations provide varying amounts based on enrollments by level and discipline, each institution in the state will receive differing total amounts for instruction and different amounts per student from the formulas. Moreover, the recognition of the differences promotes achievement of vertical equity, i.e., the unequal treatment of unequals.

Research. Included in this category are expenditures for activities designed to produce research outcomes (NACUBO, 1988). Alabama, Arkansas, Florida, Kentucky, Mississippi, Oklahoma, Oregon, South Carolina, Texas, and Tennessee each have a formula that provides funds for the research functional area (See Table 6). Florida's formula is complex and involves computations related to the magnitude of research activity engaged in at each institution. The number of research positions is calculated based on a ratio by specific department, and is then multiplied by a specified salary rate. Kentucky uses a formula that calculates a level of support that recognizes differing roles and missions in research among institutions.

Oklahoma provides a specified percent of instructional expenditures for research, depending upon institutional type, while South Carolina allocates 25 percent of the prior year sponsored and non-general fund research expenditures. Arkansas allocates a percentage of teaching salaries for research, while Texas provides an amount equal to the number of full-time equivalent faculty times $1,300. Alabama's budget formula for research provides two percent of Instruction and Academic Support allocations, plus five percent of sponsored research dollars expended in the last year for which actual data were available.

Most of these formulas incorporate horizontal and/or vertical equity features. Formulas

that provide a set amount per position (e.g., Texas) or matching funds for each dollar of sponsored research (e.g., Alabama and South Carolina) provide horizontal equity, i.e., the equal treatment of equals. Formulas that provide research support based on institutional type (e.g., Kentucky and Oklahoma) or on a percentage of instructional or other expenditures (e.g., Arkansas) meet the goals of vertical equity, i.e., the unequal treatment of unequals.

Public Service. This category includes funds expended for activities that primarily provide noninstructional services to individuals and groups external to the institution (NACUBO, 1988). Among the states, Alabama, Arkansas, Florida, Kentucky, Oklahoma, and South Carolina use a formula approach for the funding of Public Service activities (see Table 7). Arkansas specifies a percentage of teaching salaries to be allocated for Public Service. In Florida, public service positions are generated based on ratios specific to disciplines, and then multiplied by a salary amount per position. Oklahoma provides three to four percent of instructional allocations for public service, depending upon institutional type. South Carolina provides 25 percent of prior year sponsored and nongeneral fund public service expenditures, while Alabama's funding formula for public service is two percent of the combined allocations for instruction and academic support.

Academic Support. Table 8 displays summary information on the Academic Support formulas used by the states. The Academic Support category includes funds expended to provide support services for the institution's primary missions of instruction, research, and public service. The area includes expenditures for libraries, museums, and galleries; demonstration schools; media and technology, including computing support; academic administration, including deans; and separately budgeted course and curriculum development (NACUBO, 1988). However, costs associated with the office of the chief academic officer of the campus are included in the Institutional Support category.

To fund the library component of the academic support category, Alabama, Arkansas,

Florida, Georgia, Mississippi, Missouri, Montana, New Mexico, Ohio, Oklahoma, Oregon, South Carolina, Texas, and Virginia have at least one formula. South Carolina provides ten percent of total instructional costs while Texas allocates an amount per credit hour differentiated by level of instruction.

Arkansas, Florida, Missouri, South Carolina, Texas, and Virginia each have at least one formula for other components of the academic support category. South Carolina calculates an amount based on a percentage of instructional costs. Since the instructional cost allocation includes vertical equity components, Academic Support calculations based on instruction implicitly also include vertical equity components to provide an unequal amount for unequals.

Institutional Support. This category includes expenditures for the central executive level management of the institution, fiscal operations, administrative data processing, employee personnel services, space management, planning, development, and other support services (NACUBO, 1988). Table 9 displays information on the institutional support formulas used by the states. Alabama, Arkansas, Kansas, Kentucky, Mississippi, Missouri, Oklahoma, South Carolina, and West Virginia multiply a specified percentage by all other E and G expenditures to calculate institutional support needs. Florida includes some differentiation and a base amount to recognize economies of scale and complexity of operation. Texas and Virginia multiply a specified rate by a measure of enrollment to determine institutional support amounts. All of these methods achieve vertical equity given that unequals are treated unequally.

Plant Operations and Maintenance. Table 10 displays information on the plant formulas in use by the states. The plant category contains all expenditures for current operations and maintenance of the physical plant, including building maintenance, custodial services, utilities, landscape and ground, and building repairs. Not included are expenditures made from plant fund accounts, or expenditures for hospitals, auxiliary enterprises, or independent operations

(NACUBO, 1988).

South Carolina uses four formulas and Texas uses six formulas to calculate detailed plant needs. These complicated methods differentiate among types of building construction, usage of space, and size of institution. Horizontal equity is achieved in that equal dollars are provided for equal components of the physical plant. Moreover, differences among buildings are recognized and the unequal costs of maintaining, cooling, heating, and lighting each building are built into the formulas, resulting in vertical equity.

Student Services. This expenditure category includes funds expended to contribute to a student's emotional and physical well being and intellectual, social, and cultural development outside of the formal instruction process. This category includes expenditures for student activities, student organizations, counseling, the registrar's and admissions offices, and student aid administration (NACUBO, 1988) (see Table 11).

The Student Services formulas used by Alabama, Arkansas, Kentucky, South Carolina, and Texas provide a different amount per headcount or FTE student. As the size of the institution increases, the rate per student decreases to recognize economies of scale. The formula implicitly does this by adding an amount per weighted student credit hour to a base. Such a calculation inherently recognizes economies of scale.

Each of these formulas attempts to provide vertical equity in the distribution of resources by allocating unequal amounts to institutions of unequal size.

Scholarships and Fellowships. This category encompasses all expenditures for scholarships and fellowships, including prizes, awards, federal grants, and tuition and fee waivers awarded to students for which services to the institution are not required (NACUBO, 1988). Only Arkansas, Kentucky, Mississippi, Montana, South Carolina, and Virginia calculate an allocation for Scholarships and Fellowships (see Table 12). In each case, this amount is equal to a dollar value

times the number of enrolled students, full-time equivalent students, or credit hours. These approaches all provide horizontal equity but fail to provide vertical equity in that neither the cost to the student nor the institution nor the student's ability to pay are considered in the formula.

Discussion of Results and Conclusions

- The data from this and the previous surveys indicate three major findings and trends:
- Formulas are becoming more complex; As state support for higher education stagnates, institutions are attempting to protect their base budgets, often at the expense of funding formulas.
- States are attempting to address equity concerns in funding institutions of higher education through formulas.

These three findings are discussed in detail below.

Increased complexity. As indicated earlier in this paper, Caruthers (1989) had identified increased complexity in funding formulas as one of several long-term trends in formula development and usage. One of the major ways in which formulas are gaining complexity found in this analysis is through the number of formulas used by and within the functional categories (e.g., instruction) and the differentiation within these formulas. The purpose of this added complexity is clear: to recognize differences as to role and mission among institutions and different costs among academic programs. Another way in which formulas are becoming more complex is through the increasingly widespread use of peer analysis/data. Again, the purpose of using such peer data is to better account for differences in role and mission among institutions.

From a technical or public policy standpoint, this increased complexity is good. Formulas that more closely model reality or at least that which is considered reality are always preferable to more simplistic models. However, in designing and revising funding formulas, state and

institutional budgeteers should always be mindful of legislators, governors, and the other state policymakers who are the ultimate "consumers" of these formulas. Funding formulas, or at least the major components and results of the formulas, should be understandable to those making funding decisions for higher education at the state level.

Protection of base budgets. It also appears as if institutions are attempting to protect their base budgets. One indicator of this is the rapid decline in the number of states that incorporate quality or outcome measures in their formulas. These performance measures are typically tied to incentive or additional funding for institutions. As state funding for higher education becomes scarcer, institutions of higher education are understandably concerned about maintaining the funding they have with minimum restrictions and requirements from the state. Performance measures add a level of uncertainty to already uncertain funding for higher education. The AASCU (1991) study also suggested that institutions may develop funding strategies that are aimed at protecting base budgets.

Achieving equity through formulas. The final major finding of this study is that states appear to be attempting to address equity concerns among and within institutions through their funding formulas. For many states, especially in the south, this is directly related to desegregation orders filed by the federal government. It is also possible that these equity features are spillovers from state concerns with equity in K-12 funding formulas. As was discussed previously, two types of equity are achieved through formulas: horizontal (equal treatment of equals) and vertical (unequal treatment of unequals). The analysis of the formulas indicated that current formulas incorporated both horizontal and vertical equity features. An added equity dimension is the increased use of peer comparisons in formulas. This provides for equity not just within the state but also with similar institutions in other states.

In conclusion, while it does not appear that funding formula usage will necessarily grow,

it does appear that formula usage will continue to become more sophisticated. If state resources for higher education remain constrained, it is likely that formula usage and refinement will become more creative in the 1990s. Institutions probably will attempt to devise ways in which their base budgets are held harmless. However, it is also likely that legislators, governors, and other state policymakers in their concern for productivity and quality in higher education will look to base budgets for savings and increased efficiencies in institutional operations. It is likely that they will look to funding formulas as a means to meet these goals.

McKeown, M. P. (1989). State Funding Formulas for Public Institutions of Higher Education. *Journal of Education Finance, 15,* 101-102.

Since the state of Texas began to use mathematical formulas as the basis for allocating funds to institutions of higher education about forty years ago, controversy has surrounded the use of state funding formulas. The capacity of funding formulas to distribute adequate state funds to public colleges and universities in an equitable manner has been debated often, prompted by demands for economy, wise use of state resources, and accountability. During the first half of the 1980s, the debate appeared to center on the provision of educational quality in a formula environment and the availability of adequate resources when enrollments decline or remain constant.

Despite predictions that enrollments were to decline, the American Council on Education has reported that enrollments at all institutions has increased since 1980. However, clientele has shifted dramatically since the period in which most funding formulas were initiated. Student bodies now are more part-time, older, and non-traditional,"and if the reports on the status of education are to be believed, less well-prepared to benefit from a college education. Colleges and universities have changed curricula, started assessment programs, and initiated general education requirements to reestablish the public perception of providing quality graduates from a

less-than-qualified student body.

These developments in higher education should have resulted in change?, or at least some, alterations in the allocation of resources. The objective of this study was to determine the status of funding formulas used by states in resource allocation or in the budget process for public institutions of higher education. That is, this study sought to determine if changes had been made in funding formulas to reflect developments in higher education. Additionally, the study critiques developments in the use of funding formulas and in formula components.

FORMULA DEVELOPMENT

Formulas to provide budgets for or to allocate resources to institutions of higher education apparently were developed out of the necessity allocate limited resources among competing institutions.' Unlike elementary and secondary education, their funding formulas have been used by some states since the turn of" the century, states have funded higher education by formula for only the last forty years. Before World War II, a limited number of institutions of higher education served what has been described as a fairly- homogenous clientele." After the war, with the GI Bill, enrollments mushroomed, and many' new institutions, including liberal arts colleges, teacher training colleges, land grant institutions, and technical schools, were developed. As the mission and scope of the activities on the campuses increased, so did the complexity of distributing resources.

Perhaps the uneven use of state funding formulas to distribute public funds for higher education can be explained in part by the belief or value that access to a publicly funded higher education, unlike access to publicly funded elementary and secondary education, is not a basic civil right. Higher education institutions evolved in the United States as training ground for ministers, doctors, and lawyers. It was not until this century that higher education was seen as a desirable experience for all who could benefit from it.

During the 1920s, elementary and secondary school finance theorists directed their attentions to the inequities within states that had resulted from heavy reliance upon local decision making and local wealth. Elementary and secondary funding formulas were developed that addressed the issue of equity in the school systems of the state. These formulas continue to be reexamined and revised to provide greater levels of pupil and taxpayer equity.

However, this developmental pattern was not the case for higher education. The issues of student and taxpayer equity are not addressed very often in the literature of higher education finance, and certainly are not driving forces in state funding formulas. The elementary and secondary education funding, equity for the individual student and for the individual taxpayer is sought. In higher education, institutions are given the status of "individuals" and equity in the treatment of funding of the "individual" institution is sought.

Although the need for an equitable distribution of resources to public institutions certainly was a prime factor in the development of funding formulas, other factors also served as catalysts: the need to identify an adequate level of funding, institutional needs to have stability and predictability in funding, and increased professionalism among college and university business officers.."

The goal of equity in resource allocation was to provide state appropriations to each campus on the basis of its needs. To identify these needs and achieve the equitable distribution required formulas that recognized differences in size, clientele, location, and the missions of the colleges." These differences are analogous to the differences recognized in elementary and secondary funding formulas: size of the district, or small district weights; location, like weightings for rural districts; clientele, as weights for special education pupils; and mission, like weights for the high school grades. From this need, then, arose the practice of differentiation ill the components of' formulas.

Texas became the first. state to use a funding formula to allocate resources to institutions of higher education in the 1940s. By 1950, California, Indiana, and Oklahoma also were using a formula technique or cost analysis procedures." (Interestingly, in 1 988, of these three latter states, only Oklahoma continued to use a formula technique.) In 1 964, sixteen states-Alabama, California, Colorado, Florida, Georgia, Indiana, Kentucky, Mississippi, New Mexico, New York, North Carolina, Ohio, Oregon, Tennessee, Washington, and Wisconsin-were reported to be using formulas at some point in the allocation process." By 1973, the number had increased to twenty-five states," and by 1984 to thirty-four. '"

In the development of the formulas, compromises were made between the higher education institutions, state agencies with responsibility for higher education, and state agencies with responsibility for higher education, and state budget officials. Formulas have changed to reflect the political compromises that must be made in the public policy arena. For example, the original Texas formulas used a teaching salary formula based on workload factors that did not recognize differences among campus roles and missions. By 1957, a compromise set of five formulas was developed that covered teaching salaries, general administration, library, building maintenance, and custodial services. In 1961, two additional formulas for organized research and departmental operating costs were added. By 1982, Texas was using fourteen formulas that were based on complex cost studies and that recognized differences among institutions.

The rend in formula development in other states had been similar to that in Texas and has resulted in greater complexity and differentiation among the roles, missions, and clientele of the institutions. some states (e.g. Alabama) have elected to adapt other states' formulas to their situations to avoid the high cost and time required to conduct the cost studies that are the basis of most funding formulas. States continue to adapt formulas and formula components because methods that work well in one state may work equally well in others.

Prior to 1984, trends in formula budgeting included a hybridization of data into various combinations to meet the unique needs of each state. Hybridization of data has been used by combining cost analyses of specific factors, like instructional cost, with a marketplace analysis. Washington and Kentucky have used salaries paid by institutions in the surrounding states, with whom they compete in the marketplace for faculty and staff, as a component in their funding formulas. This type of comparison has been called "peer" analysis.

Prior to 1984, a trend was to include fixed and marginal cost factors in formulas as states sought to deal with declining or steady enrollments. A marginal cost is one that is related to the increase or decrease in total cost attributable to the addition or subtraction of one unit. Fixed costs are those that remain constant over the short run as volume changes. Methods such as enrollment averaging, buffering, or decoupling formulas from enrollments were being used to mitigate the impact of declining enrollments. Enrollment averaging refers to the use of an average of more than one year's enrollment in the count of the formula; buffering retards or limits the rate at which institutions lose resources during enrollment declines by providing a range of enrollments within which appropriations neither increase or decrease; decoupling refers to developing formulas that are based on factors other than enrollment.

By 1984, states were beginning to include "quality" factors in their funding formulas. Tennessee was the first state to incorporate- a component equal to 5 percent of educational and general expenditures based on output measures. Florida initiated a budget system that linked resource allocation to evaluation of academic programs. At least ten other states had some output measure that attempted to recognize and reward "quality" by 1984.'"

METHODS AND DATA SOURCES

Data on funding formulas in use by each state in 1988 were collected by a phone and mail survey of each state's governing or coordinating board for higher education. The survey also re-

quested information on anticipated or proposed changes to the state's funding formula(s). Formulas in use in 1988 were compared to formulas in use in 1984 to determine what changes, if any, had been made to the methods used in the resource allocation or budgeting process.'"

FORMULA COMPONENTS

In funding elementary and secondary education programs in the public schools, every state uses a formula for the general funding component, However, to fund public institutions of higher education, not all states use formulas. Among those states with funding formulas or funding guidelines, different uses are made in the resource allocation or budgeting process. In some states, formulas or guidelines may be used as a means of recommending to the legislature or governor a level of resources that would equitably distribute revenues among the public institutions. In other states, formulas may be used to determine the distribution of available funds among the institutions. A formula can be defined as a mathematical representation of the amount of resources or expenditures for an institution as a whole, or for a program at the institution.

For this paper, programs or functional areas refer to categories into which revenues and expenditures are placed, as defined by the National Association of College and University Budget Officers (NACUBO). The programs, functional areas, or budget categories that are commonly used are instruction, research, public service, academic support, student services, institutional support, operation and maintenance of plant, scholarships and fellowships, auxiliary enterprises, and hospitals. Auxiliary enterprises and hospitals are not usually funded by state sources, and therefore, do not usually appear in funding formula calculations.

Funding formulas may be all-inclusive or itemized in their approach. An all-inclusive formula determines the total entitlement for a program in one calculation, while an itemized formula approach would include more than one calculation or formula for each budget area. Historically, the itemized approach has been used by the majority of the states.

Three computational methods have been identified to classify formula calculations: rate per base factor (RPBF), percentage of base factor (PBF), and base factor position ratio with salary rates (BF-PR/SR). The rate per base factor method starts with an estimate of a given base, such as credit hours or full time equivalent faculty, and multiplies that factor by a specific rate. The unit rates generally have been determined by cost studies and may be differentiated. The percentage of base factor method assumes that a relationship exists between a certain base, like faculty salaries, and other areas, like departmental support.

The base factor position ratio with salary rates method is the most complex methodology, and is based on a predetermined, and supposedly optimum, ratio between a base factor, like students, and the number of personnel, like professors. then, the resulting student/faculty ratio for faculty at a certain salary level or place on a salary schedule would be multiplied by the salary for that rank or level and summed across all components to give a total formula allotment.

The base factors used in funding formulas can be classified into at least five categories: head count, number of positions, square footage or acreage, full-time equivalent students, or credit hours. Square footage or acreage are base factors used in physical plant formulas, and occasionally in institutional support calculations. Credit hours, FTES, and position count are used most often in instruction, academic support, and institutional support; head count is used most often in student services and scholarships and fellowships.

Differentiation may occur in funding formulas among academic disciplines, such as education or engineering, among levels of enrollment (freshman and sophomore, junior and senior, masters, doctoral, first professional), among types of institutions (community college, baccalaureate institution, comprehensive university, research university), or among types of buildings (brick, adobe, wood, air-conditioned, non-air-conditioned, etc.). Differentiation is used because each institution is really unique, when examined closely enough. Differentiation has

become more prevalent as more-reliable cost data have become available. Differentiation is used most often in formulas for instruction. All of the states that have instruction formulas differentiate in some way.

FORMULA USAGE IN 1988

Between 1984 and 1988, the number of states using funding formulas or guidelines in the budget or resource allocation process has decreased: thirty-four states used formulas in 1984 while only thirty-two reported formula usage in 1988. Which states used formulas also changed during the time period; for example, Arizona now reports that it uses a formula, while Michigan reports that it does not. The reverse was the case in 1984.

Frequency of use of funding formulas varies by region of the country. Among those states that are members of the Southern Regional Education Board, only one, North Carolina, reported that it does not use funding formulas. The remaining sections of the country showed varied patterns of use and non-use. States

Among the states, there continues to be a variety of uses being made for formulas in the budget development or resource allocation process. Table 2 displays the uses states make of funding formulas. In 1988, twenty nine states used formulas in the process of requesting state appropriations; fifteen states used formulas to used formulas for both requesting and allocating resources.

Just in 1984, there is great variety in the type, number, and complexity of the formulas and in the functional areas for which guidelines or formulas were established. Of the thirty two states using formulas, only Arkansas, Texas, and Mississippi had at least one formula in each of the functional areas. In 1984, only Arkansas used formulas for each of the eight functional areas. Seventeen states used at least six formulas, and Oregon used twenty-six. Each of the thirty two states used a formula in the area of Instruction.

Between 1984 and 1988, at least twelve states adopted more complex formulas for allocating or budgeting resources to public institutions of higher education. For example, Mississippi used one formula in 1984 and, in 1987, revised its methodology to include formulas for all eight of the functional areas described above. Each of the eight areas were differentiated by type of institution or used several complex calculations that consider differences among types of students or types of buildings.

Apparently, this change to a more-complex methodology reflects the growing interest among the states to adequately consider vertical equity factors (unequal treatment of unequals) instead of horizontal equity factors (equal treatment of equals). Texas and Oregon are two states that ha+'e introduced several more complex factors into the resource allocation process. These f"actors appear to recognize that institutions are unique and that differential funding is required for the uniqueness.

Another interesting development in formula usage is the apparent concern with the adequacy of the funding level instead of the equity in the distribution among competing institutions. Texas and Maryland seem to have reexamined their formulas with this thought in mind, and are allocating some of the resources based on what is perceived to be a need in the state. These allocations are in addition to the funds determined by formula calculation. Allocations of funds to specific institutions outside of the formula reduces the equity represented by the formula distribution.

In 1984, only three states were using some form of peer analysis to determine the adequacy or equity of the funding process. In 1988, twenty four states reported that some type of comparison to peer institutions was being used to determine funding deficiencies, allocate funds, or otherwise justify allocations. The twenty four states using peer analysis are listed in Table 3. Not all of the states that indicated that they were using peer analysis use funding

formulas. Moreover, at least three other states reported that, although peer analysis was not being used in 1988, studies were being completed to begin using the method in 1989.

The most common comparisons in peer analysis were reported to be faculty salaries, student-faculty ratios, and library factors. Arkansas and Connecticut use Association of Research Libraries (ARL) data to determine funding for libraries. Almost every one of the twenty four states reporting the use of peer comparisons used faculty salary data from a selected group of peer institutions, regional groups, or athletic conferences (the Big IO or Pac 10). West Virginia used peers to determine student fee levels recognized in the formula.

Another interesting development in the use of formulas is the inclusion of incentives to improve quality. In 1980, twenty states were including some measure of quality in the resource allocation or budgeting process. Tennessee's incentive funding formula methodology has been imitated by many other states. More than twenty states now have explicit incentives in their budget processes to improve the quality of higher education (see Table 4). These incentives have been included in two ways: by linking levels of appropriations to outcomes, like Tennessee has done; and by setting aside state funds to encourage "desirable" institutional behavior."

Quality improvements may be in the form of improved student performance, higher quality academic programs, lower student-faculty ratios, more efficient institutional management, institutional initiatives to address state priorities, or improved planning. For example, several states, including Texas and Maryland, have adopted special programs to encourage institutions to seek outside funding, thereby encouraging "desirable" institutional behavior. Matching funds have been set up that will, on a formula of 1 to 1, or 3 to 1, or 4 to 1, match gifts for particular purposes with state funding.

In some states, like Tennessee, a percentage of the base is set aside as a quality improvement fund that is appropriated only for special plans or programs. competitive grants are another example of the types of quality encouragements that states reported using. Many of these quality improvements or incentives are outside of the normal funding mechanism or formula, and contribute more to the adequacy of funding than to equity.The resource allocation and budgeting process for public institutions of higher education are very volatile areas. As institutions continue to evolve and modify their missions to meet the needs of the states, and as institutional clienteles become more diverse, it can be expected that funding formulas will become more complex to recognize diversity of mission, size, and clientele. states will continue to allocate resources in the manner or manners that is or are perceived to be the "best" for their state, based upon the usual value judgments of the decision-makers in that state.

If predictions were to be made about the use of funding formulas for higher education, undoubtedly the only sure prediction would be that change will continue as states attempt to distribute resources in an equitable manner. A few states will begin to use funding formulas, and some will discontinue their use. Some states will be more concerned with the adequacy of funding, as a proxy measure for "quality" of the colleges and universities, than with equity in the distribution of resources. And perhaps, in one or two states, the concept of "choice" will be included in the formula components for higher education, just as in elementary and secondary education funding.

Narro, J. and A. L. Fernandez (1983) The National University of Mexico. In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission, and Financing Options.* Tucson, Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, 67=73.

Research as a Resource of National Development. It is of vital importance to develop certain research which would originate technologies in accordance with the national needs because in a world in which knowledge and its consequences grow rapidly, the gap between the developed countries and the underdeveloped ones widens. p. 70-71

O'Connor, E. (1983). *Marginal Costs and Formula-Based Funding.* Boston, Massachusetts: The University of Massachusetts at Boston ED 240 148.

p. 1: Marginal cost is the cost of producing an additional unit. In higher education, one marginal cost would be the cost of educating an additional student.

Pickens, Wm. H. (1983). Performance Funding in Higher Education: Panacea or Peril? In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission , and Financing Options.* Tucson, Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, 192-203.

p. 192: Traditionally, funding for instruction in higher education has relied on certain measures: student credit units, contact hours, faculty workload, or degrees conferred. Partly because of academic convention and partly because of the alternatives seemed so subjective, funding formulas in higher education have usually been based on how much is done (credits and degrees) not how well it is done (changes in knowledge, enhanced lives, career development). Nevertheless, the philosophical justification for

performance funding is persuasive in that institutions should receive some income for educational results not simply for activities.

Performance Variable	Maximum Points	Method of Measurement
Proportion of Eligible Academic Programs Accredited	20	Institution has less than 75% of eligible programs accredited (0 points); 75-90% accredited (10 points); 90-99% accredited (15 points); all eligible programs accredited (20 points)
Performance of Graduates on a measure of specialized or major field outcomes	20	Institution has assessed performance of a representative sampling of graduates in one or more of its major programs within last 3 years (5 points); assessed representative sampling in the majority of programs within 3 years (10 points); assessed performance of representative sampling of graduates within past three years and can demonstrate that the performance of its graduates equal or exceed performance of graduates from similar institutions in majority of these fields (12-20 points).
Performance of graduates on a measure of general education outcomes	20	Institution has assessed performance of a representative sampling of graduates on a pilot or one-time basis during last three years (5 points); on-going program to assess performance and has data available for more than one class during last 3 years (10 points); has assessed performance and can demonstrate that its graduates performed equivalent to graduates from similar institutions (15 points); has assessed performance and can demonstrate that graduates performed above graduates of similar institutions (20 points).
Evaluation of Institutional Programs and Services by Enrolled Students, Recent Alumni, community & Employers.	20	Institution has, for any year in past three, conducted a survey of one referent group and can report results for survey of graduates for one or two academic fields (5 points); survey of two or more referent groups for one or two academic fields (10 points); survey of one referent group with application to entire institution (15 points); survey of two or more referent groups with application to entire institution (20 points).

Performance Variable	Maximum Points	Method of Measurement
Peer evaluation of academic programs	20	Institution conducted a formal evaluation of at least two major programs during last three years using team of scholars from other institutions outside the state or practicing professionals within a field (5 points); conducted at least 5 evaluations within last 5 years as part of ongoing program of peer review (6-15 points); demonstrated that one or more of its academic programs enjoy a favorable peer reputation outside the state (15-20 points).

Pickens, Wm. H. (1982). *Performance Funding in Higher Education: Panacea or Peril?*, Paper presented at a Conference on Survival in the 1980's: Quality, Mission and Financing Options. Tucson, Arizona. ED 236 980

William H. Pickens was Director of Fiscal Analysis, California Postsecondary Education Commission.

So, most states have separated funding and quality assessment. Typically, states have provided funds while the institutions themselves, through administrative rigor and faculty review, have been primarily responsible for maintaining performance. When this arrangement has broken down, state officials have usually vented their frustration by cutting budgets, rearranging governance, or funding new institutions-not by providing incentives in the formulas themselves.

Porter, J. F. (1982). *The origins and evolutions of the funding formula model utilized by the Alabama Commission on Higher Education.* Montgomery, Alabama: Alabama Commission on Higher Education.

"Formula budgeting" or "formula allocations" are terms used to describe various quantitative methods for predicting the funds necessary for the current operating costs (Operations and

Maintenance) of an institution or system of institutions of higher education. Such quantitative methods are based on models of the institution that describe the general functions of the institutions and, to varying degrees, the unique features of each institution. p. 1

DISCIPLINE GROUPINGS: [HEGIS CODES]

BUSINESS: 0500, Business and Management; 1600 Library Science; 2100, Public Affairs and Services; also undergraduate Law or Business Law.

GENERAL: 0300 Area Studies; 0400 Communications; 1100 Foreign Languages; 1500 Letters; 1700 Mathematics; 2000 Psychology; 2200 Social Sciences; 9900 Cooperative Education

EDUCATION: 0800 education

NURSING, HEALTH, ETC.: 1200 Health Professions **except** 1209 Optometry, 1211 Pharmacy and 1218 Veterinary Medicine

ENGINEERING: all of 0900, Engineering

FINE ARTS: 1000 Fine and Applied Arts

HOME ECONOMICS: 1300 Home Economics

SCIENCE: 0400 Biological Sciences; 0700 Computer & Information Science; 1900 Physical Sciences

MILITARY SCIENCE: 1800 Military Science

LAW: 1400 Law

ARCHITECTURE: 0200 Architecture & Environmental Design

AGRICULTURE: 0100 Agriculture & Natural Resources

VETERINARY MEDICINE: 1218 Veterinary Medicine

PHARMACY: 1211 Pharmacy

INTERDISCIPLINARY: 4900 Interdisciplinary Studies

The rate for Liberal Arts of $1.00 in Texas was judged to be too low and was increased to $2.00 per semester hour before the weighting factors were derived.

GENERAL ADMINISTRATION AND STUDENT SERVICES: Alabama adopted only the graduated rate per head count enrollment.

Head Count	Rate/Head count
0-5,000	$100.00
5-10,000	$ 85.00
10,000+	$ 70.00

LIBRARIES: Costs for libraries relate to the instructional load of an institution, but generally are not influenced by subject matter but by level.

	Rate Per Credit Hour Generated			
	Alabama		Texas	Alabama 1978
U. Graduate	$2.00	U. Graduate	$2.03	2.66
Graduate 1	$4.00	Mast/Sp. Prof.	$4.06	6.60
Graduate 2	$17.00	Doctoral	$17.36	28.21
Law	$11.00	Law	$10.71	17.41

Later increased by 18.5% and by an additional 5.2% in 1977, and an additional 10% in 1981

GENERAL INSTITUTIONAL EXPENSES: This item catches anything not previously included such as alumni affairs, legal services and campus wide services. In Texas this was a separately justified item in the requests. In Alabama, it was assigned a value of 2% of the sum of all requests.

In 1978: base of $300,000 and then the following formula: first 4,000 $170.60/head count; 4,000-8,000 $127.26/Head Count; 8,000+ $114.66 per head count.

CLASSIFICATION CATEGORIES: Classification structure recommended by the National Association of College and University Business Officers and the National Center for Higher Education Management Systems: Instruction, Research, Public Service, Academic Support (Administration, Libraries, etc.), Student Services, Institutional Support, Operation and Maintenance of the Plant.

RESEARCH AND PUBLIC SERVICE: 1981-9.2% of instruction.

Porter, J. W. (1976). *Formula Funding Mechanisms for State Support of Public Colleges and Universities in Michigan Based on a Study of Funding Mechanisms Across the Nation.* Lansing, Michigan: Michigan State Department of Education. ED 131 744.

"State governments, particularly since 1945, have been the governmental bodies making higher education widely available to the traditional college age population and to other citizens as well. The emphasis of state support to higher education is not contained solely to the provision of learner instruction but is aggregated among many goals: the advancement of knowledge, the promotions of educational justice, the growth and appreciation of culture, the practical application of knowledge and the critical evaluation of social performance." p. 1

In the distribution of state government appropriations to public colleges and universities the objective of equity is to provide support to each institution according to its needs...The concept of equity, as employed here, should not be confused with equality. The concept of equality is translated into providing the same amount of state income per full time equivalent student regardless of the variance of campus size and enrollments. But equity does not mean equality because program differentiation means different costs levels, enrollment size and other associated factors, equity in the distribution of state appropriation requires

differentiation according to program offerings and enrollments." p. 4

In order to continue to offer an instructional program, the operational costs and faculty salaries become relatively fixed. Because of these fixed costs, enrollment size and trends become a significant factor in defining a practice of equity in the distribution of state appropriations.

There are other factors which influence instructional costs and hence, the distribution of state appropriations. Institutional location and clientele served are two important factors. To locate campuses near population and work centers to increase opportunity and access may require a public policy objective that places a higher priority upon an adequate geographical distribution of institutions and of instructional programs rather than achieving economies of scale. Some institutions or programs may be developed to meet the higher educational needs of specific clientele groups, such as American Indians, Blacks, Spanish-speaking, refugees and others or those with a particular individual characteristic, for example the deaf, blind, and the slow-learner....equity in the distribution of state appropriations mandates the recognition of the particular purposes of an individual college or university. p. 5

A workable definitions of equity or fairness in the distribution of state government appropriations for higher education is to provide the same income resources from state general revenue funds to each institution of higher education for each full time equivalent student enrolled in comparable programs of instruction. It is recognized that there are special circumstances of enrollment size, location, stage of development and of clientele served which require modification of or exceptions to this definition. p. 6-7

There are three fundamental ingredients in an operations definition of equity. They are: (1) appropriation support based upon program costs; (2) appropriation support based upon work load; (3) appropriation support based upon a common definition of available

income. Again, it must be emphasized that the concept of equity does not mean a distribution of support involving the same amount of money for each institution regardless of size, or the same amount of funds per student regardless of programs offered. The differences will be in the support to each institution based upon work load and program differentials. These differences are significant features of a concept of equity. The key element of equity is that state institutions of higher education should be treated the same with respect to work load and in terms of program offerings. p. 7-8

... adequacy involves issues of program objectives, program size, program technology, and program support...the ultimate nature of planning programming, and budgeting in higher education is the effort to achieve adequacy. p. 9-10

Budget Areas Recognized By Formulas:

1. Instruction and departmental research: Includes compensation for academic administration, faculty members, supporting staff and clerical employees; instructional and laboratory expenses; travel; office supplies and equipment; faculty enrichment and recruiting; and other expenses for departments, colleges, and schools for instruction and unsponsored research.
2. Organized activities related to instruction: Includes all expenditures for activities organized and operated in connection with the instructional departments and conducted primarily to give professional training to students, such as agriculture college creameries and demonstrating schools for teacher education.
3. Libraries: Includes the expenses for all separately organized libraries, both general and departmental consisting of expenditures, salaries, wages and other operating expenses such as costs of procuring and maintaining the collections.
4. General administrative and general expenses: Includes all expenditures for the general

executive and administrative offices which serve the institution as a whole, as well as other expenditures of a general character not related to any specific division of the institution which is budgeted separately.

5. Student Services: Includes all expenditures for administering undergraduate and graduate admission activities, processing and maintenance of student records and reports, student registration, counseling and placement.
6. Organized research: Includes all expenditures for research projects which are organized, budgeted, or financed separately for the instructional departments.
7. Extension and public service: Includes all expenditures for activities designated primarily to serve the general public, including correspondence courses, adult study courses, public lectures, institutes, workshops, demonstration centers, package libraries, museums, and similar activities.
8. Physical plant operation and maintenance: Includes all expenditures for salaries, wages, supplies, materials, fuel and utilities, and other expenses in connection with the day-to-day operation of the physical plant and its maintenance.

Reed, Bevington (1972). *Special funding formula for state-supported upper-level institutions,* Paper presented at the Annual Meeting of the Association of Upper-Level Colleges and Universities, Dallas Texas ED060826.

Reed was the Commissioner of Higher Education in Texas at the time.

"The Texas formula system is a little different from the formula systems used in other states. the Coordinating Board has the statutory responsibility to develop formulas which will secure an equitable distribution of funds for higher education. The formulas are developed in close cooperation with representatives from Texas colleges and universities.

The Coordinating Board recommends the formulas to the Governor and the Legislative Budget Bard for their use in making their appropriations recommendations to the Legislature. The formulas are also used by institutions in making their appropriation requests to the Legislature.

However, the Governor, the Legislative Budget Board, or the governing boards of any institution of higher education can request funds which deviate from formulas prescribed by the Board by supporting such requests or recommendations with appropriate reasons and arguments.

The Coordinating Board has adopted formulas in ten different areas -- General Administration and Student Services, Faculty Salaries, Departmental Operating Expense, Library, Organized Research, Building Maintenance, and Custodial Services. Three new formulas have been adopted for the 1974-75 biennium. they are in the areas of Instructional Administration, Faculty and Staff Group Insurance, and Faculty Development Leaves." p. 4-5

"The purpose of all formulas is to provide adequate and equitable funding for the functions being performed by an institution." p.5

"... no major inequities in some present formula areas such as, General Administration and Student Services, Departmental Operating Expense, Organized Research, Building Maintenance, and Custodial Services." p. 6

Points out that institutional differences affects the area of Faculty Salaries as well as student-teacher ratio (larger in freshman and sophomore courses than in junior, senior, and graduate-level courses). "Information collected by the Coordinating Board indicates that lower division student-teacher ratios vary from 12-1 up to 32-1, whereas upper division rations range from as low as 9-1 up to 20-1." p. 6-7.

There is a marked tendency to use professors holding the highest degree in upper

division and graduate classes. These same professors are likely to have the most years of experience and therefore to draw the largest salaries. There is a corresponding tendency to use lower-ranked faculty with less experience and correspondingly lower salaries to teach lower division courses. The wide use of teaching assistants by four-year undergraduate institutions in freshman and sophomore courses also results in decreased instructional costs at the lower division level." p. 7

"Any special funding formula should be an attempt to allocate like amounts of money for like functions." p. 7

Southern Regional Education Board (1978). *Budgeting of Postsecondary Education in the Eighties, Financing Higher Education.* Atlanta, Georgia: Author.

While many states use formulas to construct a funding request, few use formulas to distribute the final appropriation. p. 2

Before turning to the issues presented by formulas as finances and enrollments change for postsecondary education, it would be well to mention the historical reasons for using formulas. Formulas became popular during the time when state systems were growing. One motive for a state shifting to formula budgeting was to insure each institution in a system an equitable share of state funds for student instruction, research, and public service. In most cases the need for a system to make budgeting seem more objective or rational was the original reason for states moving to a formula process. formulas also provided objective criteria for legislative and executive budget staff and state agencies in responding to budget requests from a system's institutions.

A second reason for formulas concerns the need to insure a base level of support each year. a formula helps to build this sense of adequacy by making explicit the key elements in

the budget process and increasing the likelihood that similar elements or processes will be a part of the results. Even during statewide austerity, institutions are assured of receiving at least minimal base funding in relation to other governmental concern. 3-4

Category	Variable Cost	Fixed Cost
Faculty teaching salaries	100%	
Other faculty (Research & Admin.)	10%	90%
Academic Support Staff Services	40%	60%
Instructional Supplies/Expenses	40%	60%
Academic Support	29%	71%
Institutional Support	5%	95%

Source Indiana Commission on Higher Education

There are good reasons to believe that some resource costs which are highly related to enrollment during growth are not as subject to being varied downward as enrollments decline, namely those of faculty with tenure and long term contracts. At the very least, detailed formulas can recognize that some resource areas of a more fixed variety, such as utilities and operation and maintenance, must decrease at lesser rates than enrollments. p.6

Spence, D. S. (1978). *Formula Funding in the SREB States.* Atlanta, Georgia: Southern Regional Education Board, ED 167 048.

A program or institution can be funded on two different bases-on for fixed costs (those costs which cannot be changed in the short-run, no matter how enrollment changes), and the other for variable costs (those costs that can be changed as enrollment changes). The sum of the total fixed and variable costs is total cost; divided by total enrollment it is the average cost per student. funding enrollment increases or decreases (changes) on the basis of an average cost

per student means that institutions receive for each additional student an amount equal to the average cost per student (of the base enrollment). Average cost includes both the fixed and variable cost components of the base costs applied to each additional student in the same, amount as to each of the students in the base enrollment. p. 8-9

Formula Items:

Instruction:	General Academic, Off campus, Preparatory & adult, Occupation & technical, Summer
Academic Support:	Academic administration, department operation
General Administration	
Departmental Research	
Public Service:	Community service, extension
Libraries:	Staff, Collections
Plant Operations & Maintenance:	Custodial, Utilities, Building Maintenance, Ground Maintenance, General services, Public Safety.
Student Services	
General Institutional	

Steen, R. W., R. Fox, J. Wisnoski and C. Jordan (1979). *The Texas formula System.* Austin, Texas: Coordinating board, Texas College and University System.

Research, however, is essential to the continued development of our civilization and there is no way to predict the outcome of a particular project. Many members of university faculties wish to devote a part of their time to research and it is essential that they be able to do so. It not only keeps them alert and productive but adds each year to the store of knowledge. Research is the foundation for changes in society ranging from culture to technology and must

be encouraged.

The formula is: Institutional complexity factor times Faculty Salaries for each year of the biennium plus 5 percent of sponsored Research funds expended during the base year times 70 percent equals dollar requests for Organized Research.

the Institutional Complexity (IC) Factor shall be computed as follows:

$$IC=\frac{0.15U+(0.5M_1+0.1M_2+0.25M_3)+(6D_1+1D_2+3D_3)}{U+N+D}$$

U=UNDERGRADUATE FTSE

M1=MASTERS FTSE IN SCIENCE AND ENGINEERING

M2=MASTERS FTSE IN TEACHER EDUCATION

M3=MASTERS FTSE IN ALL OTHER PROGRAMS

D1=DOCTORAL FTSE IN SCIENCE AND ENGINEERING

D2=DOCTORAL FTSE IN TEACHER EDUCATION

D3=DOCTORAL FTSE IN ALL OTHER PROGRAMS

FTSE=FULL TIME STUDENT EQUIVALENTS

Proposed formula: 1 percent of faculty salaries plus 20 percent of the funds generated by sponsored research.

PHYSICAL PLANT GENERAL SERVICES: SW(FTSE+7.8FTEE)+0.0028RCB

SW=AVERAGE HOURLY EARNING

FTSE=FULL TIME STUDENT EQUIVALENT

RCB=REPLACEMENT COST OF BUILDINGS AS CALCULATED IN THE FORMULA FOR BUILDING MAINTENANCE.

PROPOSED: 0.20(BUILDING MAINTENANCE+CUSTODIAL SERVICES+GROUND CARE+CAMPUS SECURITY)

ALLOW (MY AVERAGE) 1.6% FOR BUILDING MAINTENANCE (OF CONSTRUCTION COSTS)

custodial services

$$averagehourlyearningsx\frac{grosssquarefeet}{22{,}400}x2{,}080x1.2$$

Proposed: Total Square Feet x rate per square foot

GROUND MAINTENANCE: AVERAGE HOURLY EARNINGS (0.7 TOTAL LINEAR FEET OF PERIMETER OF ALL BUILDINGS +122 TOTAL ACRES OF LAWS +0.5 FALL SEMESTER HEAD-COUNT ENROLLMENT)

CAMPUS SECURITY=DOLLAR RATE(HEAD COUNT + FTE FACULTY AND STAFF)

MARYLAND FORMULA: 51,975+55.62 FULL TIME EQUIVALENT STUDENTS.

CONTINUING EDUCATION 20% OF COMMUNITY SERVICE AND CONTINUING EDUCATION INCOME FOR ADMINISTRATION AND PROMOTION.

Van Alstyne, C. (1977). *Economic Realities.* Denver, Colorado: Inservice Education Program, Education Commission of the States.

Carol Van Alstyne was the Chief Economist for the American Council on Education.

The eighteen to twenty-four-year-old cohort will decline in coming years. But fewer than half of the students currently enrolled in college are "college age." With that realization, colleges and universities are paying greater attention to the adult students they have, and are

actively seeking ways to attract more.

p. 22: But a more significant shift may be away from enrollment-driven funding formulas altogether, to entirely new bases of budgeting financial support, more firmly grounded in cost data by function and by object, adjusted for anticipated inflation with more refined price indexes for higher education. Such a shift will lead to much more rigorous requirements for identifying those costs and to the development of a whole new set of analytic techniques which yield marginal costs rather than average costs. Still more effort will be necessary to relate these costs to program quality and program diversity.

p. 22: Next to inflation of operating costs, meeting the capital requirements of higher education may be the topmost financial concern facing higher education in the 1980s. Capital is needed to rebuild endowments not yet recovered from earlier decimation because of poor stock market performance and now eroded by inflation; to renew structures undermaintained for the last five to ten years; and to implement regulatory requirements that involve major modifications of older plans and equipment to meet newly mandated standards.

p 23: Research Funding: In the late sixties, at the peak of federal support for research, every institutional dollar invested in research attracted four to five additional federal dollars. In recent years, the institutional research dollar has been matched by only tow to three federal dollars. the result of this significant shift is that an increasing share of total investment in research performed in colleges and universities is funded by the institutions themselves. Planners at the state level should be aware of this structural shift in the financing of research because it affects institutional activities, staffing, expenditures and revenues.

p. 22: Beyond educating people, colleges and universities perform activities which produce very significant social benefits. These activities range from performing basic research to delivering health care...Those making decisions about state plans and budgets need to think very carefully about the proper balance of support when they are asked to invest state funds in higher education activities that benefit not use the state but the nation.

REFERENCES

Agor, W. H. (1975). *Financing the Next Decade of Higher Education in Michigan: a Staff Report Projecting State Enrollment, Cost, and Revenue Trends to 1980 and 1985.* Lansing, Michigan: Higher Education Management Services, Michigan State Department of Education.

Alabama Commission on Higher Education (1988). *Unified Budget Recommendations for Fiscal Year 1989-90.* Montgomery, Alabama: Author ED 329 142.

Alabama Commission on Higher Education (1991). *Unified Budget Recommendations.* Montgomery, Alabama: Author.

Arkansas Department of Higher Education (1984). *General Revenue Recommendations for Arkansas Higher Education.* Little Rock, Arkansas: Author.

Association of Physical Plant Administrators of Universities and Colleges (1979). *Dr. Harvey H. Kaiser's Mortgaging the Future: The cost of Deferring Maintenance,* Washington, D.C.: Author.

Badgett, W. H. (1964). *A Formula Approach to Physical Plant Budgeting,* Texas A&M University.

Bogue, E. G. (1982). Allocation of public funds on instructional performance/quality indicators, *International Journal of Institutional Management in Higher Education, 6,* 1, p. 39.

Bogue, E. G. & Brown, W. (1982). Performance Incentives for State Colleges, *Harvard Business Review.*

Brinkman, P. (1983). Trends in Higher Education Financing. In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission , and Financing Options.* Tucson,

Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, p. 229-242.

Brinkman, P. T. (1984). Formula Budgeting: The Fourth Decade. In: L. L. Leslie (Ed.), *Responding to New Realities in Funding,* New Directions for Institutional Research, no. 43. San Francisco: Jossey-Bass.

Caruthers, J., K. and Marks, J. L. (1988). *State Funding Formulas For Higher Education In The SREB States.* Atlanta, Georgia: Southern Regional Education Board.

Chancellor's Office, The California State University and Colleges (1974). *Budget Formulas and Standards Manual.* Los Angeles, California: Budget Planning and Administration Department, Author.

Cooper, J. M. (1986). Financing Academic Libraries: Making the Transition from Enrollment Growth to Quality Enhancement, *College & Research Libraries, 47, 4,* 354-359.

Coordinating Board, Texas College and University System (1981). *Informing the Future: A Plan for Higher Education for the Eighties.* Austin, Texas: Author.

Cross, K. P., J. Valley and Associates (1974). *Planning Non-Traditional Programs: An Analysis of the Issues for Post-Secondary Education.* San Francisco: Jossey-Bass.

Curry, D. J. (1970). *A Model Budget Analysis System For Plant Operation And Maintenance,* Olympia, Washington: Office of Interinstitutional Business Studies, The Evergreen State College.

Education Commission of the States (1984). *Catalog of Changes: Incentives for Quality and Management Flexibility in Higher Education.* Boulder, Colorado: Author.

Florida State Postsecondary Education Planning Commission (1992). *State University System Funding Process.* Tallahassee, Florida: Author.

Fry, J. W. (1977). *Quality or Quantity? A Discussion of a Pilot Project in Designing State Funding Formulas Based on Performance-Quality Rather than Activity-Quantity.* Gallatin, Tenn: Volunteer State Community College.

Ginger, L. V. and Pittinger, J. C. (1974). Should the State Have Secretaries of Education, *Compact, 8,* 14-16.

Greene, C. C. (1970). *Budgeting Standards for Physical Plant Division Operations State University System of Florida.* University of Florida, Physical Plant Division.

Gross, F. M. (1979). *Formula Budgeting and the Financing of Public Higher Education: Panacea or Nemesis for the 1980s?.* Tallahassee, Fl: Florida State University, Association for Institutional Research. ED 178 004.

Gross, F. M. (1973). *A comparative analysis of the existing budget formulas used for justifying budget requests or allocating funds for the operating expenses of state-supported colleges and universities.* Doctoral Dissertation, University of Tennessee, Knoxville.

Gross, F. M. (1982). *Formula Budgeting For Higher Education: State Practices in 1979-80.* Boulder, Colorado: National Center for Higher Education Management Systems.

Gruson, E. S. (1979). *State Regulation of Higher Education in a Period of Decline.* Cambridge, Massachusetts: Sloan Commission on Government and Higher Education.

Halstead, K. (1975). *Higher Education Prices and Price Indexes.* Washington, D.C.: Office of Educational Research and Information Systems.

Huff, R. A. (1975). *Undergirding program decisions with information and unit costs: an approach to differential funding for statewide systems of postsecondary educational institutions. Paper presented at a Seminar for State Leaders in Postsecondary Education,* Hartford, Connecticut.

Jones, P. D. (1984). Innovations in State Level Formulas: Established and Emerging Trends. In: R. A. Wilson (Ed.), *Innovating and Adapting: New Financing Strategies for Colleges and Universities.* Tucson: University of Arizona, Center for the Study of Higher Education, 1-7.

Kerr, C. (1983) Survival in the 1980s. In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission , and Financing Options.* Tucson, Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, 1-12.

Kraft, Walter W. (1950). Budgeting for Maintenance Should be Based on Present Replacement Cost, *College and University Business, 8,* 5.

Lassiter, R. L. (1983). *Funding and budgeting formulas and the availability and allocation of resources to public universities.* Paper presented at the fifty-third annual conference of the Southern Economic Association, Washington, DC, November 20, 1983, ED 255 126.

Lassiter, R. L. (1983). The development of a faculty salary model for a system of higher education, *Research in Higher Education, 18,* 3.

Legislative Commission of the Legislative Counsel Bureau, State of Nevada (1986). *Study of funding of higher education in Nevada.* Carson City, Nevada: Author ED 301 085.

Lenning, O. T. (1977). *Previous attempts to structure educational outcomes and outcome related concepts: A compilation and review of the literature.* Boulder, Colorado: National Center for Higher Education Management Systems.

Lenning, O. T., Lee, Y. S., Micek S.S. and Service A.L. (1977). *A structure for the outcomes of postsecondary education.* Boulder, Colorado: National Center for Higher Education Management Systems.

Lewis, G. A. (1981). *Bibliographic Materials Fund Allocation Formula In Use At Radford*

University. Radford, Virginia: Radford College. ED 207 547.

Maryland State Board for Higher Education (1982). *FY 1984 Consolidated Capital and Operating Budget for Higher Education.* Baltimore, Maryland: Author

Maryland State Board for Higher Education (1984). *Operating Budget Guidelines Development.* Annapolis, Maryland: Author.

McClintock, D. L. (1980). *Formula Budgeting: An Approach to Facilities Funding.* Washington, D.C.: Association of Physical Plant Administrators of Universities and Colleges.

McKeown, M. P. (1989). State Funding Formulas for Public Institutions of Higher Education. *Journal of Education Finance, 15,* 101-102.

Meeth, L. R. (1975). *Government Funding Policies and Nontraditional Programs.* Washington, D.C.: Institute for Educational Leadership.

MGT Of America, Inc. (1991). *An Analysis Of the Processes Used To Fund The State University System Of Florida.* Tallahassee, Florida: Author.

Miller, J. L. (1964). *State Budgeting for Higher Education: The Use of Formulas and Cost analysis.* Ann Arbor: Institute for Public Administration, The University of Michigan.

National Association of College and University Business Officers (1980). *Costing for Policy Analysis.* Washington, D.C.: Author.

Narro, J. and Fernandez, A.L. (1983) The National University of Mexico. In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission , and Financing Options.* Tucson, Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, 67-73.

North Dakota State Board of Higher Education (1984). *Funding North Dakota Higher Education.* Author.

O'Connor, E. (1983). *Marginal Costs and Formula-Based Funding.* Boston, Massachusetts: The University of Massachusetts at Boston. ED 240 148.

Pickens, Wm. H. (1982). *Performance Funding in Higher Education: Panacea or Peril?, Paper presented at a Conference on Survival in the 1980's: Quality, Mission and Financing Options.* Tucson, Arizona. ED 236 980

Pickens, W. H. (1983). Performance Funding in Higher Education: Panacea or Peril? In: R. A. Wilson and L. I. Leslie, *Survival in the 1980s: Quality, Mission , and Financing Options.* Tucson, Arizona: Center for the Study of Higher Education, College of Education, University of Arizona, 192-203.

Porter, J. F. (1982). *The origins and evolutions of the funding formula model utilized by the Alabama Commission on Higher Education.* Montgomery, Alabama: Alabama Commission on Higher Education.

Porter, J. W. (1976). *Formula Funding Mechanisms for State Support of Public Colleges and Universities in Michigan Based on a Study of Funding Mechanisms Across the Nation.* Lansing, Michigan: Michigan State Department of Education. ED 131 744.

Reed, B. (1972). *Special funding formula for state-supported upper-level institutions,* Paper presented at the Annual Meeting of the Association of Upper-Level Colleges and Universities, Dallas, Texas. ED060826.

Southern Regional Education Board (1978). *Budgeting of Postsecondary Education in the Eighties, Financing Higher Education.* Atlanta, Georgia: Author.

Spence, D. S. (1978). *Formula Funding in the SREB States.* Atlanta, Georgia: Southern Regional Education Board, ED 167 048.

Steen, R. W., Fox, R., Wisnoski J. and Jordan C. (1979). *The Texas Formula System.* Austin, Texas: Coordinating Board, Texas College and University System.

Tennessee Higher Education Commission (1972). *Instructions for Preparing and Submitting Requests for Legislative appropriations for Operating Expenses: Fiscal Year Ending June 30, 1974.* Nashville: Author.

Thomas, Wm. (1968). *Financing of Higher Education in Public Institutions in Texas.* Wichita Falls, Texas: School of Business Administration, Midwestern University.

The Association of College and Research Libraries (1975). *Standards for College Libraries.* Chicago: Author.

Van Alstyne, C. (1977). *Economic Realities.* Denver, Colorado: Inservice Education program, Education Commission of the States.

Virginia Council for Higher Education (1982). *Operating Budget Guidelines and Special Requirements for 1984-1986 Biennium.* Richmond, Virginia: Author.

Weber, G. O. and Weber, G.O. (1972). *Formula Budgeting for Physical Plants of Universities and Colleges. University of Maryland.* Baltimore, Maryland: Maryland State Board for Higher. Education

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